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The following works have been received for review:—

Handbuch der Historisch-Geographischen Pathologie, von Dr. AUGUST HIRSON, Zweite Abtheilung: Die Chronischen Infections- und Intoxications Krankheiten, Parasitäre Krankheiten, Infectiöse Wund Krankheiten und Chronische Ernährungsanomalien. Stuttgart, Ferdinand Enke, 1883.

Officieller Katalog der Allgemeinen Deutschen Ausstellung auf dem Gebiete der Hygiene und des Rettungswesens. Berlin, 1883.

Vormost zum Officiellen Katalog der Hygiene. Ausstellung in Berlin, 1883.

Ueber den gegenwärtigen Stand der internen Therapie und den therapeutischen unterricht an der deutschen Hochschulen. Von Dr. M. ROSSBACH. Berlin, 1883.

Ueber die Taubheit bei hysterischer Hemianästhesie. Von Herr Dr. G. L. WALTON. Berlin, 1883.

Ueber die Aenderungen der Leistungsfähigkeit und der Enigbarkeit des ermüdeten Froshherzens. By THOMAS J. MARS, M.D.

Über die Wirkungen der verdünnten Luft auf den Organismus. Eine experimental Untersuchung. Von Dr. A. FRÄNKEL und Dr. J. GEPPERT. Berlin. A. Hirschwald, 1883.

Über Gelenkresektionen bei Caries. Von Prof. Dr. E. ALBERT. Wien, 1883.

Sur Quelques Causes de Maladies de l'Oreille. Par A. DUCAU. Paris: Octave Doin, 1883.

De l'Emploi de la Resorcine dans le traitement du chancre simple chez la Femme. Par MM. les Drs. A. LEBLOND et FISSIAUX. Paris: H. Lauwereyns, 1883.

Considerations sur un cas de Fièvre Typhoïde compliqués d'Arthrites et de Synovites Purulentes Généralisées. Par le Dr. ALBERT ROBIN. Paris, 1882.

Note sur une des causes de la Lithiase unique et oxalique chez les Enfants du Premier Age. Par le Dr. ALBERT ROBIN. Paris, 1883.

De la Production de Phenol dans l'Organisme considérée au point de vue Physiologique et Clinique. Par le Dr. ALBERT ROBIN. Paris, 1882.

De l'Urine dans l'Hématurie des Calculus. Par le Dr. ALBERT ROBIN, Lauréat de l'Institut et de la Faculté de Médecine. Paris, 1878.

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Discours Prononcé sur la Tombe de M. le Professeur LASÈGUE. Par les Professeurs Germain SÈR, POTAIN, et MM. les Docteurs LEGROUX, FERNET, et MOTCH.

Manuel des Injections sous-cutanées. Par BOURNEVILLE, Médecin de Bicêtre et Bricon, M.D. Paris, 1883. Pp. xxxvi., 175. A. Delahaye & E. Leerosnier.

Des Affections Cérébrales consécutives aux Lésions Non-traumatiques du Rœher et de l'Appareil auditif. Par le Dr. ALBERT ROBIN. Paris: J. B. Baillièrre, 1883.

Essai d'Urologie Clinique. La Fièvre Typhoïde. Par le Dr. ALBERT ROBIN. Paris: J. B. Baillièrre et Fils, 1883.

Traité des Fièvres Bilieuses et Typhiques des Pays Chauds. Par le Dr. A. CORRE, Professeur Agrégé à l'Ecole de Médecine Navale de Brest. Paris: O. Doin, 1883.

De l'Exeision du Goitre Parenchymateux, par le Dr. PAUL LIEBRECHT, Assistant à l'Université de Liège. Bruxelles, 1883.

Chirurgie Orthopédique; Leçons Cliniques Professées à l'Hôpital des Enfants Malades. Par Dr. L. A. DE SAINT-GERMAIN, Chirurgien de l'Hôpital des Enfants Malades. Recueillies et Publiées. Par la Dr. PIERRE J. MERCIER. Paris: J. B. Baillière et Fils, 1883.

Pathology of Bronchitis, Catarrhal Pneumonia, Tubercle and allied Lesions of the Human Lung. By D. J. HAMILTON, M.B., F.R.C.S.E., F.R.S.E., Professor of Pathological Anatomy, University of Aberdeen. London: Macmillan & Co., 1883.

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St. Bartholomew's Hospital Reports, 1882.

Observations on Lithotomy, Lithotripsy, and the Early Detection of Stone in the Bladder. With a Description of a new method of Tapping the Bladder. By REGINALD HARRISON, F.R.C.S. London: J. & A. Churchill, 1883.

Transfusion; Its History, Indications, and Modes of Application. By CHAS. EGERTON JENNINGS, L.R.C.P. Lond., etc. London: Baillière, Tindall & Cox, 1883.

Practical Lessons in Elementary Physiology and Physiological Anatomy. For Schools and Science Classes. By D. M'ALPINE, F.C.S. London: Baillière, Tindall & Cox, 1883.

On some of the Advances which have been made in Abdominal Surgery during the last Decade. By JAMES WHITSON, M.D., etc.

Photography of Microscopic Sections. By JAMES WHITSON, M.D.

Notes of a case of Enteric Fever which had two Relapses, with an unusual prolongation of the Interval between the first and second attacks. By ROBT H. FORREST, M.D.

Medical Education, Character, and Conduct. Introductory Addresses delivered to the Students of Medicine in Edinburgh and Glasgow, 1855-1860-1882. By W. T. GAIRDNER, M.D., Professor of Medicine in the University of Glasgow. Glasgow, 1883.

Sanitary Contrasts of the British and French Armies during the Crimean War. By Surgeon-General T. LONGMORE, C.B. London: Charles Griffin & Co., 1883.

Nitrite of Sodium in the Treatment of Angina Pectoris. By MATTHEW HAY, M.D., Demonstrator of Practical Materia Medica in the University of Edinburgh, 1883.

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Proceedings of the N. W. Provinces and Oudh Branch of the British Medical Association, January, February, March, 1883.

The Principles and Practice of Medical Jurisprudence. By the late ALFRED SWAINNE TAYLOR, M.D., F.R.S., Fellow of the Royal College of Physicians of London. Third edition. Edited by THOMAS STEVENSON, M.D., F.R.C.P. Lond., Lect. Med. Jurisprudence, at Guy's Hospital, etc. 2 Vols. Philadelphia: Henry C. Lea's Son & Co., 1883.

A Practical Treatise on Impotence, Sterility, and allied Disorders of the Male Sexual Organs. By SAMUEL W. GROSS, A.M., M.D., Professor of the Principles of Surgery and of Clinical Surgery in the Jefferson Medical College of Philadelphia. Second edition, thoroughly revised. Philadelphia: Henry C. Lea's Son & Co., 1883.

Students' Guide to Diseases of the Eye. By EDWARD NETTLESHIP, F.R.C.S., Ophthalmic Surgeon to St. Thomas's Hospital, etc. Second American from the second revised and enlarged English edition. With a chapter on Examination for Color Perception. By WM. THOMSON, M.D., Professor of Ophthalmology in Jefferson Medical College. Philadelphia: Henry C. Lea's Son & Co., 1883.

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Manual of Auscultation and Percussion, embracing the Physical Diagnosis of Diseases of the Lungs and Heart, and of Thoracic Aneurism. By AUSTIN FLINT, M.D., Professor of Principles and Practice of Medicine in the Bellevue Hospital Medical College. Third edition, revised. Philadelphia: Henry C. Lea's Son & Co., 1883.

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Lectures on Diseases of the Nervous System, delivered at Guy's Hospital. By SAMUEL WILKS, M.D., F.R.S. Second edition. Philadelphia: P. Blakiston, Son & Co., 1883.

The Dispensatory of the United States of America. By Dr. GEO. B. WOOD and Dr. FRANKLIN BACHE. Fifteenth edition. By H. C. WOOD, M.D., JOSEPH P. REMINGTON, Ph.G., and SAMUEL P. SADTLER, Ph.G. Philadelphia: J. B. Lippincott & Co. 1883.

Lectures on Orthopedic Surgery and Diseases of the Joints. By LEWIS A. SAYRE, M.D., Professor of Orthopedic Surgery and Clinical Surgery in Bellevue Hospital Medical College, etc. Second edition. New York: D. Appleton & Co., 1883.

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Diseases of the Ovaries. By LAWSON TAIT, F.R.C.S. Fourth edition. New York: Wm. Wood & Co., 1883.

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Index of the Practice of Medicine. By WESLEY M. CARPENTER, M.D. New York: Wm. Wood & Co., 1883.

Diseases of Women. A Manual for Physicians and Students. By HEINRICH FRITSCH, M.D., Professor of Gynecology in the University of Halle. Translated by Isidor Furst. New York: Wm. Wood & Co., 1883.

The Microscope and its Revelations. By WILLIAM B. CARPENTER, C.B., M.D., LL.D., F.R.S., etc. Sixth edition. 2 Vols. New York: Wm. Wood & Co., 1883.

The International Encyclopedia of Surgery. A Systematic Treatise on the Theory and Practice of Surgery. By Authors of Various Nations. Edited by JOHN ASHURST, Jr., M.D. Vol. III. New York: Wm. Wood & Co., 1883.

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Labor among Primitive Peoples. Showing the Development of the Obstetric Science of to-day, from the natural and instinctive customs of all Races. By GEORGE J. ENGELMANN, A.M., M.D., Professor of Obstetrics in the Post-Graduate School of the Missouri Medical College, etc. Second edition. St. Louis: J. H. Chambers & Co., 1883.

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The Clinical History, and exact Localization of Perinephric Abscess. By JOHN B. ROBERTS, M.D., of Philadelphia.

The Rational Treatment of Spasmodic Asthma. By RICHARD B. FAULKNER, M.D. Tubercular Cerebro-Spinal Meningitis. By J. T. ESKRIDGE, M.D., Physician to St. Mary's and Jefferson College Hospitals.

Treatment of Chronic Nasal Catarrh. By J. ADDISON STUCKY, M.D.

Observations on a Series of Fifteen Successful Cases of Ovariectomy. By O. O. BURGESS, M.D.

Symptoms and Diagnosis of Malaria in Children. By L. EMMET HOLT, A.M., M.D. Alcohol; as a Food, a Medicine, a Poison, and as a Luxury. By GEO. C. PITZER, M.D. St. Louis, 1883.

Cancer of the Intestinal Tract: Operations for the removal of Malignant Strictures of Pylorus and Intestines. Together with a brief review of the Historical Development of Modern Abdominal Surgery. By REUBEN A. VANCE, M.D., etc., Cleveland, Ohio.

An Argument submitted to the Cuyahoga County Medical Society, April 3, 1883, upon the question of the justifiability of operations for the removal of Cancer of the Intestinal Tract.

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Clinical Lecture on the Mechanical Treatment of Caries of the Lumbar Vertebrae. By Dr. M. JOSIAH ROBERTS.

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Bilateral Secondary Descending Sclerosis and Atrophy mainly of Pons Varolii and Medulla Oblongata. By WM. JULIUS MICKLE, M.D., M.R.C.P., 1883.

The Higher Professional Life. Valedictory Address to the Graduating Class of Jefferson Medical College. Philadelphia, April 2, 1882. By J. M. DA COSTA, M.D., Professor of the Practice of Medicine.

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Smallpox and Smallpox Hospital of New Orleans. New Orleans, 1883.

Case of Double Hydronephrosis with Dilatation of the Bladder and Ureters, due to Disease of the Prostate Gland. By D. WEBSTER PRENTISS, A.M., M.D.

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First Annual Report of the Provincial Board of Health of Ontario, for the year 1882.

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Census of the City of Providence, January 1, 1883; taken under the direction of EDWIN M. SNOW, M.D., Superintendent.

Annual Report of the Retreat for the Insane at Hartford, Conn. April, 1883.

Report of the State Asylum for the Relief of Persons Deprived of their Reason, 1883.

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Report of the State Lunatic Asylum at Utica, for 1882. Albany, 1883.

Fifth Annual Report of the Managers of the Adams Nervine Asylum, 1882. Boston.

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Report of the State Board of Health of New Jersey, for 1882.

Fourth Annual Report. Board of Health, City of Memphis, 1882. By G. B. THORNTON, M.D., President.

Report of Investigation of the Central Kentucky Lunatic Asylum. Sept. 1882.

Report of Pennsylvania Training School for Feeble-Minded Children, 1882.

Report of the Trustees of the Massachusetts General Hospital, 1882. Boston.

Communicable Diseases in Michigan during the year ending September 30, 1882, and Work of Boards of Health restricting the same. Lansing, 1883.

The usual American and foreign exchanges have been received; their separate acknowledgment is omitted for want of space.

Communications intended for publication, and books for review, should be sent *free of expense*, directed to I. MINIS HAYS, M.D., Editor of the American Journal of the Medical Sciences, care of Henry C. Lea's Son & Co., Philadelphia. Parcels directed as above, and (carriage paid) under cover, to Messrs. Nimmo & Bain, Booksellers, No. 14 King William Street, Charing Cross, London, will reach us safely and without delay.

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ARTICLE I.

CASES OF LESIONS OF PERIPHERAL NERVE-TRUNKS, WITH COMMENTARIES.

By S. WEIR MITCHELL, M.D., Member of the National Academy of Sciences, U. S. A.

CASE I. *Peculiar Nutritive Changes of Palm and Back of Hand ascribed to Milking; Herpes; Neuralgia; Elongation of Median Nerve; Section of Radial Nerve.*—L. C., æt. 40, first came to the Infirmary for Nervous Diseases in Nov. 1880, with the following brief history: Some ten years ago she noticed a numbness in the palm of the right hand, apparent, however, only when milking cows, though six months later she also observed it during ironing. Succeeding this "numbness," pain made itself manifest, affecting the palm and all the fingers of the hand, but not extending up the arm. This condition grew gradually worse, until two years ago she was unable to make use of the hand on account of the suffering. The trouble was most apparent in the morning when first awakening, and was increased both in extent and intensity by cold, while warmth or pressure in a measure relieved it. On examination the pain was found to be located in the palm between the second and third metacarpal bones, and to extend through to the dorsal aspect of the hand. No pain was felt elsewhere, nor did pressure along any of the nerve tracts either of the hand or arm disclose any other painful spot, although a callosity about the size of a pea was noticed upon the anterior surface of the wrist. Sensation as to touch appeared to be normal, and the muscles were firm and well developed, though the dynamometer indicated a loss of strength in the affected hand. There was, however, neither muscular atrophy, contractions, joint disease, glossy skin, nor even the changes in nail-growth which usually accompany impairment of nutrition.

Some three months ago a herpetic eruption made its appearance in a small area on the back of the affected hand. She has also presented for some years on the face and breast a bronzed appearance similar to the bronzing of Addison's disease. Beyond the points mentioned she was in excellent general health. At the time of her first visit, sulphate of

strychnia was prescribed, one-fortieth gr. t. d., and she was directed to increase the dose to the one-twentieth gr., while the lactate of iron was also ordered in doses of three grs. t. d.

In April, 1881, she returned, reporting considerable improvement. The eruption, however, had become a distinct sore, eczematous in character, and some little time previous it had begun to discharge a thin, grayish-yellow pus, although the diseased region was not painful to the touch; whenever it healed, and the discharge ceased, the pain became much worse. She was given Fowler's solution at the time of her second visit, beginning with five drops t. d., and the amount gradually increased till toxic effects were produced. Galvanism was also ordered to be applied to the hand and arm with special reference to the median and musculo-spiral nerves, one electrode being placed over the sore spot in the hand. During May and June, 1881, she received twenty-eight applications of the continuous galvanic current, which acted very favourably. The pain in the hand lessened so considerably as to cause but little trouble, while the sore on the back of the hand gradually healed. There was no longer any discharge or desquamation, and all that was left was a spot of reddened and somewhat hypertrophied skin. In August the trouble again became worse, and a small abscess of the size of a pea formed on the back of the hand, between the first and second metacarpal bones. Following this, a second small abscess appeared on the ulnar aspect of the forearm, while a third formed in the palm. In addition to these, other abscesses have developed from time to time, one near the middle of the radial side of the forearm, and more recently one rather high up on the posterior surface of the forearm, while at one time there were four present, all on the dorsal aspect of the hand, two over the metacarpal bone of the thumb, one near the base of the second and third metacarpals, and the last just in front of the styloid process of the ulna. At no time has she had any abscesses above the elbow.

The treatment by the continuous galvanic current was persisted in faithfully for a long period, but, as it did not afford any permanent relief, it was finally decided to resort to more positive measures. I advised that one or both of the nerves supplying the affected part, the median and radial, be stretched, and she entered the hospital the 9th of February, 1882. At a consultation with the surgeons, Drs. Hunt and Morton, it was thought well to try specific treatment before resorting to operative measures, and she was, therefore, put on large doses of the iodide of potassium and given mercurials, with, however, no beneficial results. Hence it was finally resolved to stretch the median nerve; but to await the result of this measure before disturbing the radial.

On the 9th of March the median was cut down upon, caught up on a tenaculum and thoroughly stretched, not only by traction, but also by allowing it to support for a minute the full weight of the arm. During the stretching, the pulse was peculiarly affected, becoming slow, hard, and full, the retardation lasting for some two hours after the operation. She reacted well from the ether, but appeared to suffer slightly from shock, the extremities becoming quite cold. The edges of the incision were carefully united by sutures and the hand supported on a straight anterior splint. Toward evening she complained of a burning pain along the course of the nerve extending up to the brachial plexus. But with this exception and that of a slight soreness through the wrist, no trouble ensued, and by the 15th day the wound was entirely healed.

As a result of the operation, the following facts were noticed: Two hours after the operation, the temperature of the right hand, as indicated by a surface thermometer, was two degrees higher than that of the other. Four days later a careful examination by Dr. Morris Lewis disclosed an increased area of dysæsthesia, the loss of sensation apparently including a part of the radial distribution. There was but little of the former pain, but some sense of numbness, while a forming abscess was rapidly crusting over, and a small blister, the sure precursor to an ulcer, which had begun to appear on the back of the hand previous to the operation, had entirely disappeared. Within the third week the pain recurred with all the former severity, and for the next month she had several returns of neuralgia as severe as any former attack, although of short duration. A "sore spot" also appeared on the web, between the thumb and forefinger together with a dull aching of the wrist, and tenderness along the line of the cicatrix.

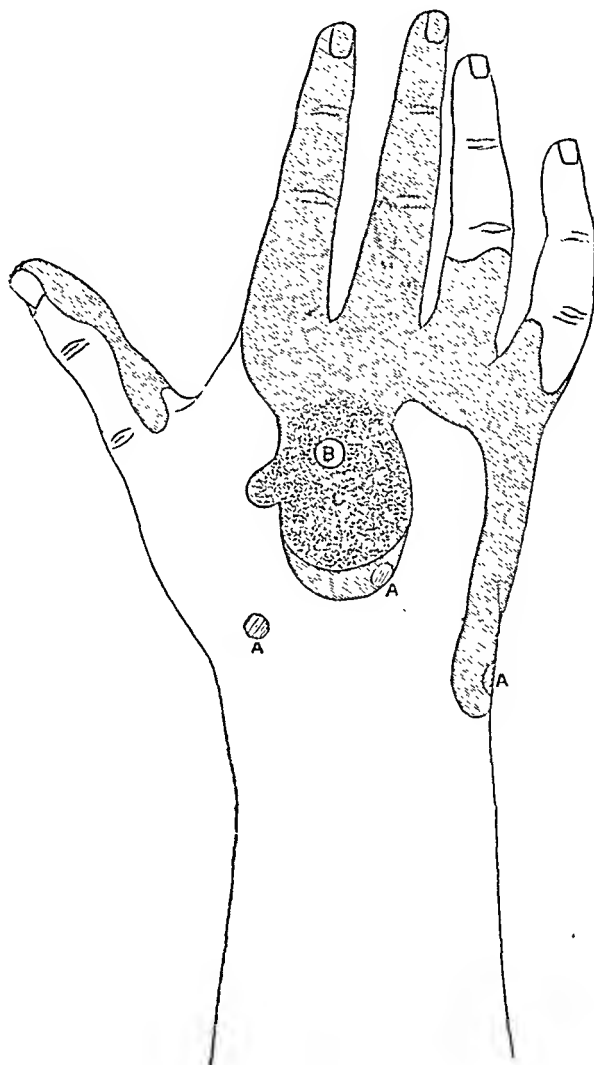
On the 2d of May she was ordered massage of the affected arm from the shoulder downwards, especial care being directed to the kneading of the muscles of the hand. A sedative lotion was also applied, as it appeared to have some favourable influence upon the pain, which was causing her as much suffering as at any previous period. On the 5th of May static electricity was employed daily, an electrode being approximated to either side of the hand and sparks passed through it. This treatment appeared to relieve the pain temporarily, the static current acting more favourably than the galvanic current, in that it produced no burning sensation whatever, while it possessed as marked an influence over the pain.

But none of these measures were of any permanent value; indeed on May 16, a small bleb had made its appearance on the back of the hand and soon ruptured, leaving a superficial ulcer, so that it was evident that the stretching of the median nerve had not resulted in any material relief. A month of grace was yet allowed, but as the matter became gradually worse, on the 14th of June it was thought well to interfere with the radial distribution. Inasmuch as simple stretching of the median nerve had proved ineffectual, it was resolved to employ the more radical treatment of nerve section. The operation was performed under ether by Dr. Hunt, assisted by Dr. Morton, and one and three-quarter inches of the radial nerve were removed just above the wrist. No serious consequences followed, the patient reacting well, though the same slowing of the pulse was remarked as in the previous operation. A straight splint was applied to the forearm with a dressing of lint and cosmoline, while a teaspoonful of the official solution of morphia was exhibited internally. The healing of the wound was rapid, and attended with little pain, which was referred wholly to the neck and shoulder, the hand being entirely free from the former aching and burning sensations. On the 30th of June, she was discharged greatly relieved.

At present, November 16, her condition is as follows: She is very much improved in her general appearance, and since the last operation she has had no eruption on the back of the hand, nor any severe pain through the palm. There is, however, a nearly constant aching in the fleshy portion of the hand increased by use, which is also followed by very severe aching sensations in the shoulder and neck similar to those that came on directly after the operations. The first cicatrix causes her no inconvenience whatever, while the second, sensitive even to the friction of the clothing, is still very tender.

Remarks.—It is not the number of cases which adds to our knowledge so much as the care with which each is studied, and in no branch more than in nerve injuries is this illustrated. Unhappily, in the past these cases have fallen almost wholly into the hands of the surgeons, who are largely accountable for the lost opportunities they represent.

Fig. 1.



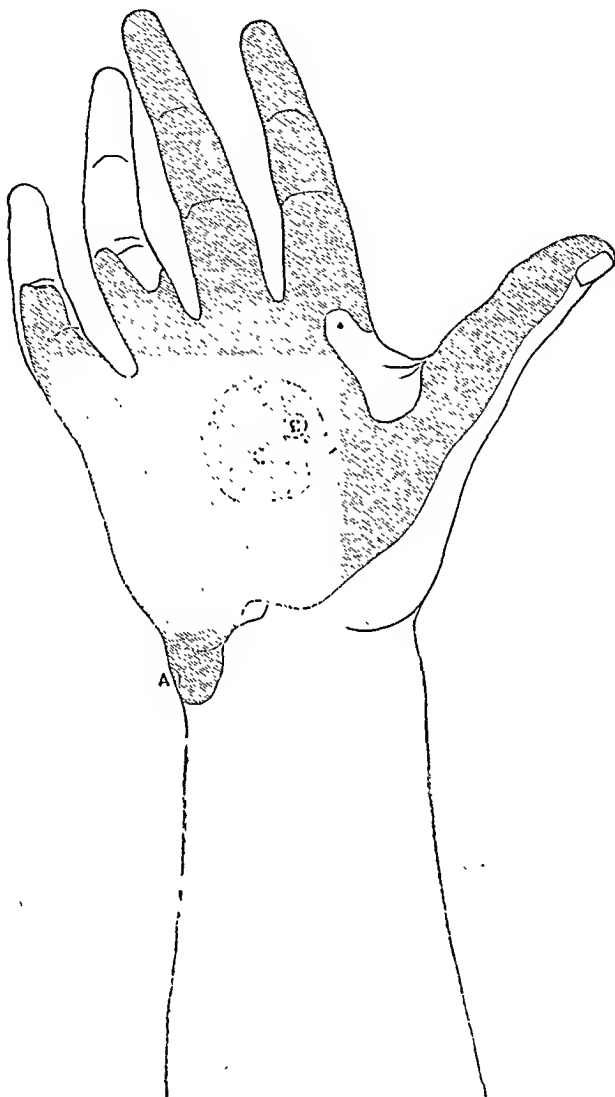
Dorsum.

The present case, of which I have just given a detailed history, will bear some comment. The patient ascribes its onset to the act of milking cows. It seems possible that this might give rise—nay is sometimes known to give rise to loss of power—similar in character to the pareses of the writer—but it appears difficult to comprehend how it could be the parent

of such a condition as this person presented when first I saw her. Nevertheless she persists in stating that at first the numbness with which her trouble began was only felt while milking. This may well have been, and yet the act of milking not be responsible for the origin of the disease.

The pain and discomfort were the chief reasons for resort to operation,

Fig. 2.

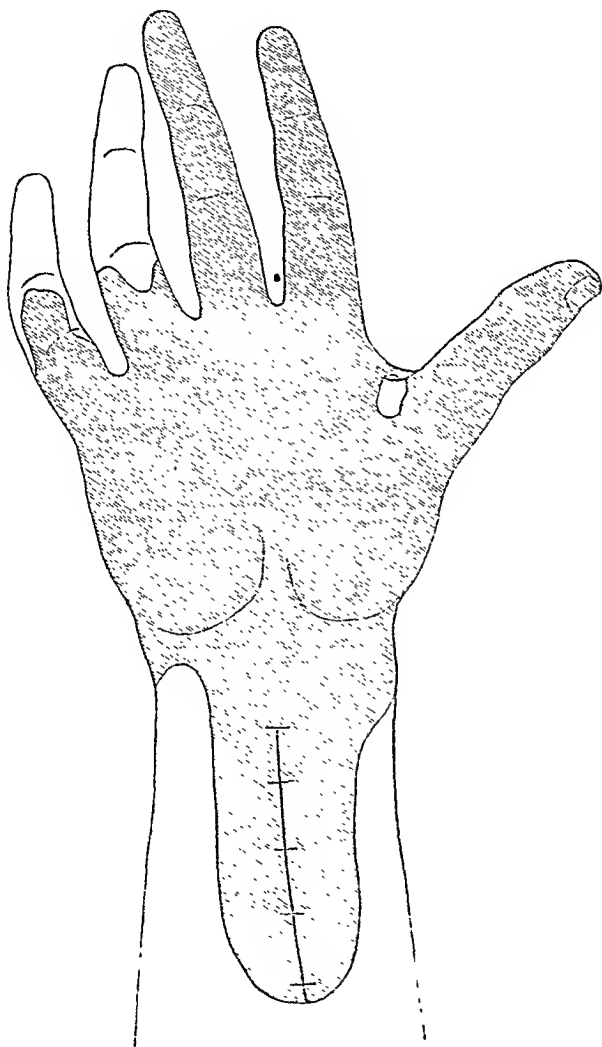


Palm.

and there was in my mind much doubt as to what nerve I should attack. For although the herpes and ulcers and much of the pain were distinctly in the radial distribution, the original seat of pain was in the palm at the point of divergence of the median branches. I finally decided to stretch the median. On the 11th of February, two days after an attack of pain,

Dr. Morris Lewis, assistant physician to the Infirmary, made a careful study of the areas of disturbed sensation, and mapped them out in colours on a cast of a hand, as represented in Diagrams Nos. 1 and 2. A careful examination of these figures, and of those made at later dates, will show some of the obscurities which still surround this most difficult question of nerve distribution, and of the effects of stretching or section.

Fig. 3.



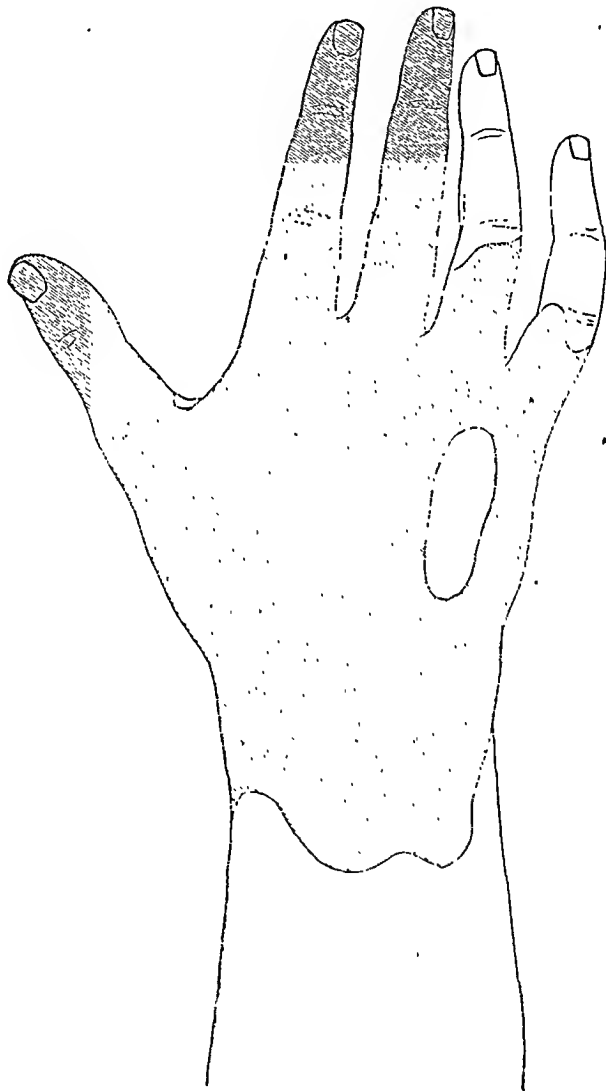
Palm.

The region of dysæsthesia, that is, of defective sensation of touch, is included within the continuous lines. It is remarkably irregular, and covers most of the median, and some of the ulnar and radial territory, but does not include all of any one of these nerve distributions. The

regions of ulceration and herpetic eruption are stippled, and the two points of occasional causalgia are marked as B B, and the points where abscesses occurred, by the letter A.

On the 9th of March the median nerve was stretched. I then observed for the first time what is, perhaps, a common phenomenon, the sudden slow-

Fig. 4.



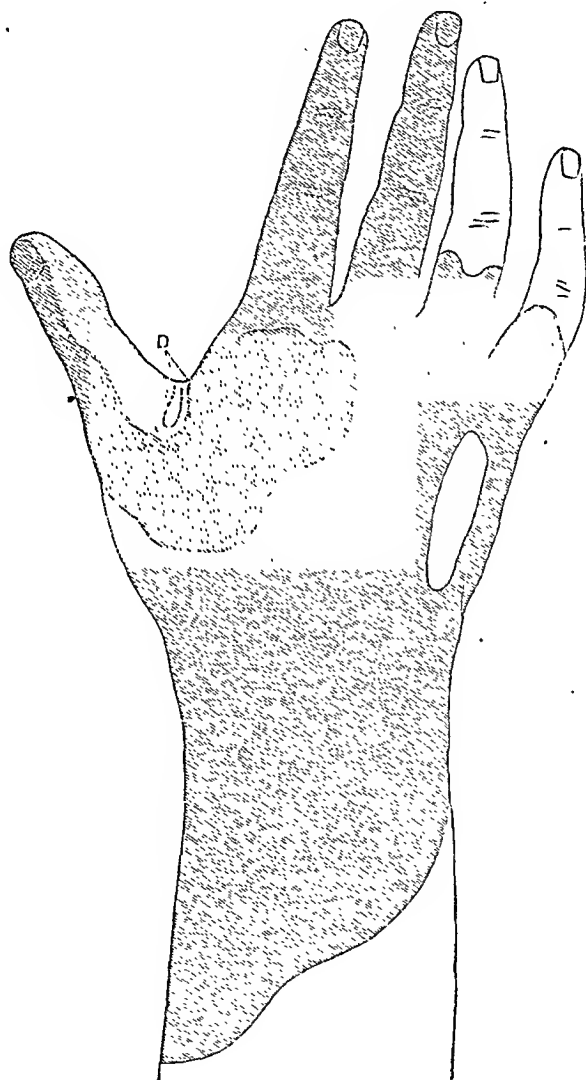
Dorsum.

ing of the pulse at the moment of stretching the nerve. The pulse fell from 98 to 80, and continued to preserve this rate for two hours.

Stretching raised the temperature two degrees in the median territory precisely as happens after section. On March 28th, nineteen days after the operation, Dr. Morris Lewis made for me the diagrams Nos. 3 and 4.

The area of the original dysæsthesia had widened so as to include regions within the ulnar and radial distribution as well as the median. The space thus lessened in sensibility is remarkable; nor is it possible to explain its extent by any theory of direct effects, or by any unusual distribution of the median. We must, I think, conclude that the centres were in some

Fig. 5.



Dorsum.

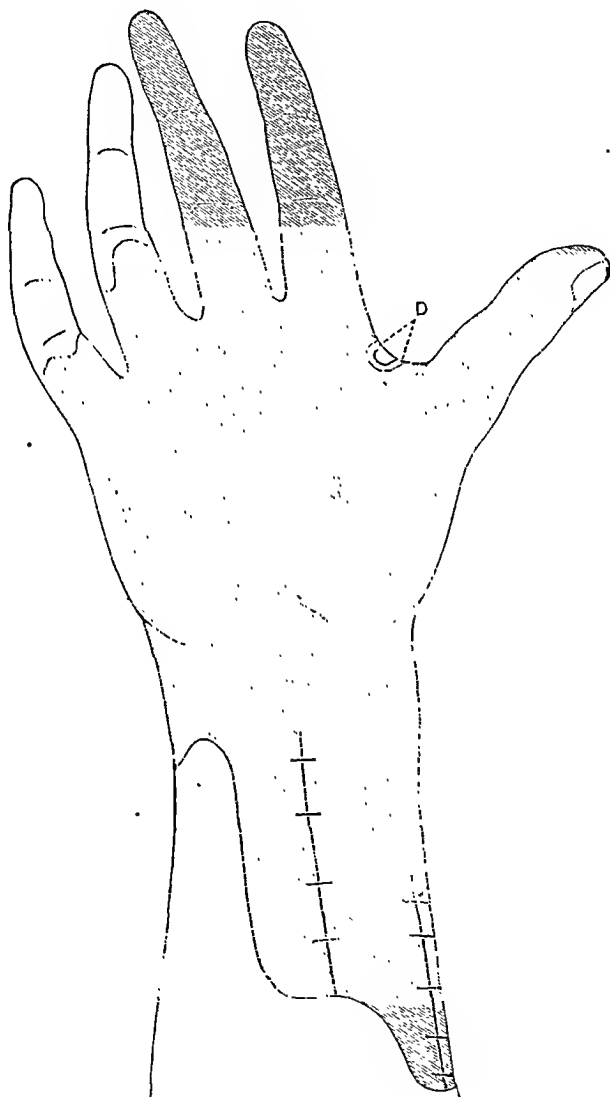
way widely influenced by the operation. Certainly, the observation is both novel and interesting. The dysæsthesia as to touch so caused was much alike throughout, and the pain sense was merely deadened, not lost, and varied in degree within the affected space.

The first beneficial influence of the operation was to lessen the causalgia

and relieve the trophoneurosis. The return of these symptoms after some months, and the continuous increase of pain in the forearm and arm, induced me finally to resort to further measures. Accordingly Dr. Hunt, on the 11th of June, 1882, divided the radial nerve just above the wrist.

The slowing of the heart was again observed, and the usual rise of

Fig. 6.



Palm.

temperature. *The operation again, and still further, extended the dysæsthesia.* The patch of good sensation in the dorsal ulnar region remained nearly as before, and some slight changes were seen in the dorsal and palmar aspect of the fourth and fifth digits. In the wrist and arm there was a large extension of the dysæsthetic areas, whilst on the back of the hand

there was found an irregular region shaded black in Diagram 5, within which all sense of pain as well as of touch was lost. This area is of unusual form, since after radial nerve section these losses are not found to be as extensive as in the present case. As a rule, section of the radial leaves the dorsal aspect of several, and sometimes of all of the fingers, more or less insensible to touch, but in the present case there is no increase of the previous defect, nor any added dysæsthesia of the fourth and fifth digits. For what it destroyed and for what it left unaltered this section is remarkable. See Diagrams 5 and 6. It may be noticed in Diagrams 3 and 4, that stretching the median left a little spot of normal feeling at the base of the palmar face of the thumb. Section of the radial left a similar spot rather nearer to the dorsum, at the base of the thumb, but around it was found in addition a narrow band (one line in breadth) of well-marked burning pain and hyperæsthesia. Diagrams 5 and 6 (D).

Amongst the various points of interest in this case, none exceeds in value the abrupt extension of the areas of lessened sensation which was seen after the operations on the median and radial nerves. I have said that this was not to be accounted for upon any knowledge we now have of the peripheral distribution of nerves—since in one case the dysæsthesia spread far beyond the region tributary to the nerve stretched or cut; and, in the other, in some directions did not cover the whole regions usually affected after radial nerve sections. As I have been very watchful of my cases, I can be sure that this is not a common incident of sections of nerves. But it is not altogether new to my experience. Generally speaking, the symptom is to be considered as one of the many forms of shock. A sudden injury to a nerve already morbidly altered gives rise to an inhibition of function in certain closely related centres. The disturbance might be in the direction of motor or of sensory inhibition, and both forms are among the rarer phenomena of nerve wounds from rifle-balls. The fact itself is less surprising than its permanence, nor is it easy to comprehend the precise nature of an influence which may act on such varied functions, and act so persistently.

The curative results of the operation remain after ten months all that I could wish them to be.

CASE II. *Facial Neuralgia, originating in the Left Supra-Orbital Nerve, and finally affecting other branches, relieved by Section of the Infra-Orbital Nerve.*—Mrs. M., æt. 68, had for some years suffered with pain which arose first in the left supra-orbital nerve, and now for some months affected with equal and extreme severity the infra-orbital nerve, and at times the infra-maxillary.

As every imaginable drug had been used, and galvanism failed to relieve, I decided to divide both the supra- and infra-orbital nerves at one sitting.

The case is brought forward to illustrate a point of practical value, and of extreme importance. If I had had to choose which single nerve I

should sever, I should certainly have selected the supra-orbital, in which the pain began. It chanced that I was indisposed at the time set for the operation, and therefore sent word to my colleagues, Dr. Hunt, who operated, and Dr. Morton, who assisted him, to go on without me. In this consultation they concluded as a measure of prudence to divide but one nerve, and not being aware of the reasons which would have then led me to choose the supra-orbital, they divided the infra-orbital nerve.

The results were, however, to annihilate pain in all branches of the fifth nerve, and to leave on my mind a most valuable lesson, since nine months later the same satisfactory condition of things still exists.

The mode of reaching this nerve is not a matter of indifference.

In this case the antrum was broken into, and, if I correctly remember, my friend Prof. Brinton, who has operated for me several times on the infra-orbital, prefers this operation. On the whole, however, it seems to me desirable not to break into the antrum. Indeed, I should like in a future case, merely to cut the nerve in front, and again far back in the orbit, and then to leave a small plug of bone or ivory in the little canal, or to close the canal with dental cement. I do not observe that in this case the scar is tender, nor in fact is it apt to be—whilst it is frequently the case when incisions are made on the forearm and a large nerve is cut that the cicatrix remains tender.

CASE III. *Neuralgia of Left Inferior Maxillary Nerve; Extension of Pain to other Branches; Section of Nerve; Return of Pain; Second Section and Obliteration of Canal with Dental Cement, January 28, 1883.*—Miss —, of New Jersey, æt. 43, underwent in April, 1881, by my advice, a resection of the inferior dental nerve on the left side, the operation being performed by Dr. Morton. The ease and the immediate results were reported in THE MEDICAL NEWS for March 11, 1882.

After a long period of ease, some time in March or April, 1882, the pain returned in the jaw at the old seat, and in June, 1882, had become as bad as before. The pain had all the usual peculiarities of these neuralgias, and was not limited to the lower nerve, but was felt in both the temporal and orbital branches. At my desire, her home adviser, Dr. Ed. North, of Hamonton, gave her very large doses of aconite, which certainly abolished the pain; but in December, 1882, it returned anew, and in January, 1883, she was readmitted in a pitiable state of suffering. On close study it was found that sensation had been restored in the area figured in my last report of her case as having lost it. In some places the touch sense was still imperfect, but it was nowhere destroyed, and throughout a needle prick could be felt. Clearly the nerve had been remade, and I was again face to face with this difficult question. After exhausting all means at our disposal, it was agreed, in consultation, to seek for the nerve in the canal at the point where formerly it had been severed, and to divide it anew.

At the same time I felt that the operation might fail, like the last one, to give permanent relief, but that at least I should be more secure if I could in some way provide against reunion of the nerve ends. I had thought of plugging the canal with bone or ivory, or of thrusting periosteum into it, but finally decided to fill it with dental cement.

On January 28th, Dr. Morton operated, the patient having been etherized. On exposing the bone, a small trephine was applied about an inch and a quarter in advance of the angle of the jaw, but the canal thus uncovered was ill-defined, and amidst the crushing caused by the trephine, the bleeding, and the obscure cancellous structure, we could find or see no re-made nerve. When the tissues were pushed back a little the old trephine mark was disclosed. It had filled up with bone except for an opening about a line wide, from which projected a button-like prominence, which proved to be a stump of nerve tissue. Unhappily the knife had swept over it, and whether or not it furnished filaments running forward over the bone cannot now be known.

On trephining, so as to include it, we failed, again to trace filaments running along the irregular canal, which certainly existed. The operation enabled us to pull out the nerve trunk some distance, and after stretching to sever it. A more careful search was then made for the filaments presumed to have reconnected the central end with the sensitive skin spaces on the chin. Finding none, the canal was cleaned out, and the two ends of the canal thoroughly filled with warm dental cement, which admits of being easily moulded when hot, and then hardens. What is to be the result of this very novel procedure we have yet to see. Sensation was again destroyed in the region fed by the inferior maxillary nerve, showing that the nerve had been remade and again severed during the operation. At this date—May 10, 1883—there has been a recent return of neuralgic pain, but so far no inflammatory disturbance from the presence of the cement, as to the use of which both Dr. Morton and I have had such anxiety, as naturally attends the use of perfectly new methods. The same mode of obliterating the canal has been more recently resorted to by Dr. Morton in another case of resection of the infra-maxillary nerve.

CASE IV. Affection of Nerves of Left Arm; Remarkable Lowering of Temperature.—September 4, 1882. S. M., male, æt. 51, distributing agent in mail car. Has had good health, with the exception of some dyspepsia; has never had syphilis; has used little or no tobacco, and is temperate in all ways.

During the war his right elbow was injured by a ball, the joint subsequently undergoing ankylosis. Owing to this he has been compelled to perform an unusual proportion of work with the left hand, especially in the distribution of mail matter.

About one year ago he noticed a certain loss of power in the fourth and fifth fingers of the left hand without numbness or pain. Two or three weeks subsequently the weakness extended to the other fingers of the left hand, and was then accompanied by some pain in the forearm. At this time (September 5, 1881) he was compelled to give up work, but this weakness has not grown worse since. For the last six months, on the approach of storms, he has had pain extending from the shoulder to the finger-tips.

The pain-sense is somewhat blunted in the hand and the lower half of the forearm. The touch-sense is also defective, and in the finger-tips the limit of confusion of the compass points is six lines.

There is no atrophy in the arm. All the hand muscles are wasted, though not excessively. There is occasional tremor in the index finger, and also in the second finger. Dynamometer, right, 100; left, 60. No loss of mobility in the arm. He can extend and flex the hand, and extend and flex the fingers perfectly, except the third and fourth fingers, extension of which is imperfect. He can oppose the thumb to the forefinger, but

not to the other fingers. Is unable to button his clothes, or to pick up any object with the fingers.

The appearance of the unsound hand is singular. It is mottled dark red and pale red, or is throughout of a deep dusky red, especially as to the nails. The skin is smooth rather than glossy, sweats with great ease, and is usually cold to the touch. In fact a subsequent careful examination of the temperature of the two hands showed a remarkable difference. On January 15th, for instance, the sound hand stood at 98.2° Fahr.; the unsound hand 93.4° . After massage for thirty minutes, the temperature became: sound hand, 98.6° ; unsound hand, 98.5° .

The next day, January 16th, the hands were, at 10.30 A. M.: sound, 98.7° ; unsound, 95° . After reaction, consequent on being out in the cold, they stood: sound hand, 88.8° ; unsound hand, 91.2° .

Observations taken subsequently at different times showed the temperature of the unsound hand to fluctuate between 98.8° and 93.2° . On one occasion, when the sound hand showed 97.3° , the unsound one registered 83.2° . During these observations the temperature in the left axilla remained 98.6° .

The reflex actions of the hand are markedly increased. A tap on any portion of the arm below the elbow, whether on muscle or on bone, gives a flexor reflex, which is much more energetic when the tendons are struck. Tapping the extensor tendons in the wrist or hand, gives also a marked reflex action. Direct mechanical irritation, as of a tap with a rubber mallet, will cause fibrillary, or entire contraction in any muscles of the forearm or hand over a space corresponding to the area of the percussing body.

Electrical condition: *F. C.*, Reaction slightly lessened, but present in all the muscles and nerves.

Galvanic C. Quantitative lessening only, the normal formula of polarity, *Ka.S.Z.*—*An. S.* z remaining unchanged.

Under the steady use of tonics and galvanic electricity, with daily massage, the hand gradually improved in power, and the pain entirely disappeared.

The remarkable feature of the case was the fall of temperature, a symptom exceptionally rare in examples of any form of neuritis, whether of internal or of traumatic origin, and one which I find it quite impossible to explain. Certainly, in the more frequent cases of inflammation of the nerves of the hand itself with causalgia—absent in this case—there is a rise and not a fall of temperature. In the present instance, a rare one, the nerve tracts on the hand were not sensitive to pressure, the joint and nail lesions were but slight, and the shining skin of causalgia was not well marked. On the other hand, the nerve tracts in the neck, axilla, and arm were tender.

Nothing which we know as yet explains all the clinical phenomena of these interesting cases, and, in all probability, some of the variations in the symptoms are to be attributed to differences in the character of the disorder affecting the nerve trunks, or even to the nature of the causes originating the active pathological condition.

Thus, when the ulnar nerve is frozen at the elbow, as has been done both by Waller and myself, the temperature rises in the ulnar territories; but,

if the experiment be carried too far, and there is, as a consequence, total loss of feeling for some days, the temperature falls and remains for a time below the normal. Now the first effect from freezing is to cause complete but brief loss of sense and motion, due to the fact that below a certain temperature, nerve-trunks cease to carry messages, and then the temperature rises. If, however, according to Waller, the subsequent nerve-changes, probably congestive in their character, be profound enough to destroy the apparent power of the nerves, the temperatures fall. But still more remarkable is it that when the loss of motion and feeling is brought about experimentally by pressure on the nerve-trunks, there is always a fall, and never a rise of temperature in the area fed by the nerve-trunks thus acted upon (Waller).

CASE V. Dislocation of Left Humerus into Axilla; immediate and increasing Nerve Lesions; unusual Nutritive Changes resembling Abscess; Extravasation of Blood.—K. B., female, æt. 24, single, a worker on the sewing machine, although delicate, was fairly well until August 1, 1882, when she fell some three feet, and falling on the left side, with her arm outstretched, found on rising intense pain in the left axilla, tingling to the finger ends, and inability due to pain to allow the arm to fall in to the side in a dependent position. So severe was the pain that an injection of morphia merely lessened it, and no ease could be had except by bending to the left so as to allow the arm to form a right angle with the body. On the second day, there was marked weakness in the finger motions, and the tingling became worse. On the sixth day, she came to the city, where one of the surgeons of the Jefferson Medical College Clinic promptly recognized and reduced the dislocation.

Nevertheless the pain and loss of power increased, and a month from the date of the accident the back of the arm and hand began to swell, especially on the ulnar side, and somewhat later the swelling extended to the palm. At first this swelling looked like the not very rare puffiness sometimes seen in the hand after a nerve lesion, but it soon became mottled with extravasated blood, and presented a very threatening appearance, which with varying amounts of pain, lasted until October, 1882, at which time a large blister on the arm brought about a decisive change for the better. As, however, the inhibition of movement due to pain grew less, it became clear that the fingers were almost totally paralyzed.

In December, 1882, the interossei of the hand, and generally all the muscles fed by the ulnar nerve, had wasted exceedingly. January 8, 1883, the patient applied at Dr. Wharton Sinkler's clinic with these conditions.

Left arm somewhat wasted—great atrophy of the interossei—a typical specimen of the "claw hand." There is the very common loss or early return of sensation, it is now difficult to say which. Sensation is nearly normal, except in the palmar surface of the hand and the fourth or fifth digits where the skin is tense, shining, red, and exquisitely sensitive, with a lessening amount of causalgia, while in the forearm only is there constant aching. The swelling above described had totally disappeared, but the joint changes which are usually limited to the fingers affected also the wrist, elbow, and shoulder, and served to add to the great difficulties of the case. The nails were deeply notched by numerous transverse ridges.

Electrical Condition.—F. C. No response except in the following muscles: flexor carpi radialis, flexor longus pollicis, and biceps. The shoulder muscles all respond well, except the deltoid which responds feebly.

G. C. No reaction in the intrinsic hand muscles, except in the adductor pollicis and first dorsal interosseus. *Muscles of forearm.* No reaction in the long extensors of the hand and fingers except in the exten. ossis metacarpi pol. and ext. indicis; these, together with all the long extensors of the hand and fingers, are readily moved by the interrupted galvanic current, but present a changed formula, indicating the reaction of degeneration, as follows: Ka. S. z—An. S. Z.

The biceps, triceps, and deltoid present only a quantitative lessening of response.

The electro-sensibility is abnormally acute.

Ordered galvanism (interrupted) and massage on alternate days.

April 24, 1883. She has persevered in the treatment with regularity. The arm is better in every way, so that she has now little or no pain, and much more voluntary motion. All the muscles of forearm now respond to the galvanic current, although but little change has taken place in the short muscles of the hand.

The nerve lesions arising from dislocations are due rarely to the reducing process; and much oftener as in this case to the injury caused by the accident. In dislocation downward into the axilla, when the force is great, with tear of the capsule and bruise or tear of the circumflex nerve, there is apt to be also injury to the plexus, and in dislocations under the clavicle or under the coracoid process the nerves seem also liable to suffer; but of the liability to nerve-lesion in these several accidents there is yet needed some more precise study. It will be found, I think, that in many dislocations there are slight nerve-lesions, especially in the circumflex nerve, and that their trifling nature has kept them from being noticed by surgeons.

I do not think it very common to find the primary traumatic lesion competent to produce very great loss of sense or motion. There is a little numbness, the bone is replaced, and in a week or two, the secondary changes in the nerve-trunks occasion increasing losses which may prove enduringly disastrous.

ARTICLE II.

ON CONTUSIONS OF THE BRAIN AND OF THE SPINAL CORD. By JOHN A. LIDELL, A.M., M.D., late Surgeon to Bellevue Hospital, also late Surgeon U. S. Volunteers, etc.

As the inner table of the skull may be fractured by the impact of solid bodies upon the scalp, or upon the exterior of the skull itself, while the outer table remains unbroken (*see the number of this Journal for April,*

1882, p. 325 *et seq.*), so the substance of the brain may be bruised, crushed, or torn by external violence, and likewise may become stained, infiltrated, or compressed with blood extravasated from its ruptured vessels, while the osseous shell that envelops it sustains no perceptible injury. But, inasmuch as the brain-substance is immensely more fragile than the inner table of the skull, the last mentioned form of injury occurs with immensely greater frequency than the first.

Want of space will not now permit an exposition of the principles or laws of mechanics which are involved in the causation of such injuries, although the subject is both attractive and important.

For the sake of enjoying clearness of view, it should be stated at the outset, that the production of a contusion of the brain, or of the spinal cord, is invariably attended with the production of a concussion of the brain, or of the spinal cord, both forms of injury alike and simultaneously resulting from the same display of external violence, and the former being in the true sense of the word a complication of the latter. It is self-evident that any blow on the head or on the back, which bruises the brain or the spinal cord, must also produce concussion (commotion) of the bruised organ, at the same instant of time.

Moreover, contusions of the substance of the brain, or of that of the spinal cord are, in reality, concealed wounds of these organs, which frequently present many of the appearances or peculiarities that pertain to lacerated wounds, just as external contusions, for instance those of the scalp, are often found to do. But, speaking with more exactness, contusions of the brain, and of the spinal cord, are solutions of continuity that involve the elementary structures of which these organs are composed, namely, the ganglion-cells, nerve-tubes, neuroglia, and bloodvessels; and they are met with only as complications of the concussions of these organs, as stated above. These internal contusions, however, are injuries of great importance. Leaving depressed fractures out of the reckoning, wounds of the brain-substance in the shape of bruises fill a large space in the domain of cerebral traumatisms; for, as cerebral concussions are notoriously of very frequent occurrence, so also cerebral contusions, caused by the very same external potencies, are not unfrequently met with in connection with them.

And the experience gathered in the post-mortem rooms at a number of great hospitals, as well as in private practice, has shown that death from uncomplicated concussion of the brain never takes place, and that contusion of the brain is nearly always associated with concussion in the fatal instances. More than fifty years ago, the now renowned Dr. Bright, of Guy's Hospital, pointed out that in fatal cases of cerebral concussion there might be found, not only minute extravasations of blood disseminated in the substance of the brain, deeply as well as superficially, but also the circumscribed patches which characterize contusions. (*Medical Cases,*

vol. ii. part i., 1831, p. 408.) Mr. Bryant says: "At Guy's Hospital, during fifteen years, no case is recorded of death from concussion without change of brain-structure." (*Practice of Surgery*, p. 161, Am. ed. 1879.)

Mr. Prescott Hewett, of St. George's Hospital, states: "That in every case in which I have seen death occur shortly after, and in consequence of an injury of the head, I have invariably found ample evidence of the damage done to the cranial contents." (*Holmes's System of Surgery*, vol. ii. p. 302, 2d ed.)

Mr. Le Gros Clark, of St. Thomas's Hospital, declares: "I have never made nor witnessed a *post-mortem* examination after speedy death from a blow on the head, where there was not palpable physical lesion of the brain." (*Brit. Med. Journ.*, 1868.)

M. Fano, a French writer on the same subject, concludes: "That the symptoms generally attributed to concussion are due, not to the concussion itself, but to contusion of the brain, or to extravasation of blood." (*Mém. de la Soc. de Chirurg. de Paris*, t. iii. p. 199.)

Moreover, there is but one case on record in which death having resulted apparently from concussion of the brain, a carefully conducted autopsy failed to reveal any lesion of the brain-substance; but this patient seems to have also had Bright's disease. The case, however, possesses so much interest in this connection that it appears necessary to present a brief account of it; Samuel L., aged 55, on September 23, at night, was struck on the back of his head, a little to the right of the middle line, by a carriage; he was knocked down, and the carriage went over his legs; no wound nor bruise on the head was noted. The accident was followed directly by violent headache, persistent and paroxysmal, accompanied with great giddiness, diplopia, impairment of the senses of smell and taste, and of the faculty of speech; finally, hemiplegia of the right side supervened, and death from coma occurred soon afterward, on December 6th, at 3 A.M., on the seventy-fourth day after the accident.

Autopsy, forty-six hours after death.—"The convolutions looked healthy; and no morbid appearance nor any softening, could be found in any part of the brain. The corpora striata, optie thalami, fornix, corpus callosum, and, in fine, every part of the brain, were examined carefully, both fresh, and after preservation for a time in spirit; and no morbid appearance was detected anywhere. The cerebellum, pons, and medulla oblongata were equally healthy." The legs were *œdematous*, having become so shortly before death. The kidneys were slightly *granular*, and contained a few small cysts, and some small masses of fibrine on their exterior. The *cortical structure* was rather *pale*. (*Brit. Med. Journ.*, Feb. 19, 1859, p. 145.)

The evidences of confirmed renal disease were revealed by the autopsy; and, doubtless, the peculiar symptoms and the fatal issue of this case were

mainly due to the renal disease. And, had there been circumscribed patches of cerebral œdema (which are liable to form in Bright's disease), no trace of them might have been still visible so late as forty-six hours after death, on the one hand; or, they might readily have been overlooked, on the other. At any rate, this case (which was reported by Prof. Parke), in consequence of being complicated with Bright's disease, furnishes no exception to the rule that death from uncomplicated concussion of the brain never occurs.

Finally, on reviewing with care the numerous clinical and post-mortem observations of an exact nature which have been placed on record concerning the injuries in question, especially in recent years, we reach two important conclusions which are fully sustained by the testimony: (1) That whenever death results apparently from concussion of the brain, contusion of the brain or some other complicating disorder is invariably present, and that the fatal issue is always due to the complication, and not to the cerebral concussion itself. (2) That the complication which is almost invariably present, in such cases, is bruising or contusion of the encephalon.

But, to what extent, or with what frequency, cerebral contusion occurs in the cases of cerebral concussion which do not prove fatal, is an open question. I can, however, unite heartily with Dr. Neudörfer, of the Austrian Army, in declaring that I have never seen concussion of the brain, properly so called, *i. e.*, uncomplicated with contusion of the brain, except in cases where the injury of the encephalon was trivial. Moreover, in the few instances of concussion reported, wherein death has ensued from other causes, some injury of the brain-substance has generally been found; and in all such instances wherein the fatal issue has resulted from secondary inflammation, some evidence of contusion of the brain has likewise been found on examination *post mortem*.

That slight or even moderate concussions of the brain sometimes, perhaps not unfrequently, occur without being complicated with contusions of the brain, I do not doubt. Indeed, I shall by and by present an example in which there was a stunning in consequence of a fall upon the head and shoulders, that lasted some minutes, and death resulted about thirty hours afterward from contusion of the spinal cord, yet no evidence of cerebral contusion whatever was revealed by the autopsy. Contusion of the brain is, therefore, not synonymous with concussion of the brain; but, at the same time, all the evidence now collected tends to prove that the severe instances of cerebral concussion are always complicated with cerebral contusion. Concussion of the brain, however, derives its chief importance from the fact that it is very often associated with contusion of the brain; and, in examining a case of cerebral concussion, the question of most importance for the surgeon to decide is whether or not cerebral contusion is also present.

These are points of doctrine which practically have much interest for

patients as well as practitioners, because of the influence they are likely to exert in the direction of procuring a correct diagnosis and, consequently, a wise treatment; for, in the disorders of no other parts of the body is it more true that an accurate diagnosis begets a wise plan of treatment than in those of the brain and spinal cord. Inasmuch as it is the mechanical injury—the disintegration and rupture of the brain-substance, and its blood-vessels—or the hemorrhage resulting therefrom, which in reality do the harm in nearly all the cases of cerebral concussion, unattended by fracture, that give trouble, or do badly in any way, these lesions of structure and their consequences are the things which ought to receive principally the surgeon's attention while conducting the treatment of such cases; and should he have previously made himself thoroughly familiar with the subject of cerebral contusions as almost the sole complications of the cerebral concussions that are without fracture, and with the various consequences which immediately or remotely result from these lesions of the brain-structure whether attended or unattended by fracture, he will be very much less liable to adopt a mistaken, incorrect, or inefficacious plan of treatment, whenever such cases shall come under his care.

Nevertheless, our text-books on surgery, with but few exceptions, and likewise most of our lectures on surgery (as there are good grounds for fearing and believing), either do not discuss contusions of the brain at all, or they do it in a very inadequate manner—one quite unworthy of the subject. While much is said by all of them on the subject of cerebral concussion—of its dangers and of its importance—but small if any mention is made, excepting by the praiseworthy few, of the contusions of the brain which so very often complicate the concussions, and impart to them whatever of gravity, be it much or little, that they may chance to possess. And still less mention is made of the contusions of the spinal cord. No wonder, then, that bruises of the brain-structure, and of the spinal cord-substance, occur much more frequently than is generally supposed, that the relationship which exists between these injuries and concussions is not well understood in the profession at large, and that the bruises of these organs often escape all notice, and even all suspicion, during life. An article on contusions of the brain, and of the spinal cord, may therefore prove timely and serviceable.

Before presenting some examples, whereof I have preserved the notes, as well as some others, it may be advisable to premise in a general way, as follows: (1) Whenever contusion of the brain is produced, the lesion of the brain-substance is usually found either directly underneath the scalp-wound, *i. e.*, directly underneath the external point of impact, or on exactly the opposite side of the encephalon. The latter often occurs, and is truly said to be caused by the *contre-coup*. (2) Bruises of the cortical portion of the brain and pia mater, when exposed to view, oftentimes do not differ much in appearance from bruises of the subcutaneous connective tis-

sue, for both injuries alike are attended by ecchymosis. In numerous instances, however, there is a much more copious extravasation of blood, in cases of cerebral contusion, than that which occurs in ordinary ecchymosis, and not unfrequently this extravasation proceeds so far as to cause death, *per se*, by compressing the brain. Such sanguinolent extravasations are met with, (a) beneath the so-called visceral arachnoid membrane, *i. e.*, in the meshes of the pia mater, and furrows of the brain; (b) in the so-called cavity of the arachnoid membrane,¹ *i. e.*, on the free surface of that membrane; (c) in the ventricles of the brain; (d) to the foregoing must be added those minute extravasations of blood (having the size of millet seeds), which are occasionally found disseminated in great numbers through the brain-substance, deeply as well as superficially. (3) Bruises of the brain often cause traumatic encephalitis, which eventuates either in subsidence and recovery, or in suppuration and cerebral abscess, or in permanent disturbance of the mental faculties, sometimes accompanied also by epileptiform convulsions.

I shall now proceed to point out what never has been clearly shown before, the intimate relationship which exists between cerebral contusions and the formation of cerebral abscesses.

CASE I. *Contusion of the Cerebrum complicating Contusion of the Scalp caused by a Spent Bullet; Adhesive Meningitis; Cerebritis and Cerebral Abscess; Death; Autopsy.*—Colonel Noah L. F., while convalescing from camp fever, was wounded at the first battle of Bull Run July 21, 1861, by a spent musket-ball, which contused and lacerated (slightly) the outer layers of his scalp, over the left parietal bone, three inches above the auditory meatus. He was much stunned, and fell from his horse. On the 24th, he was admitted to the Washington Infirmary, where the present writer saw him; the scalp-wound was half an inch in length, quite superficial, and already nearly healed. On the 26th, numbness of his right hand was noted, all the fingers being equally involved. On the 28th, his right foot also became numb. Two days later, paralysis of motion in these parts ensued. There was headache at this time, but it did not appear to be a very marked symptom. The wound healed promptly, no febrile movement was noted, and his condition was considered a hopeful one, *i. e.*, it was thought he would recover, until August 10th, when grave cerebral symptoms with hemiplegia (of the right side) appeared. Coma followed, and in that state he died on the 14th, having survived the contusion twenty-four days. It was then remembered that he had been irritable, morose, much inclined to keep his bed, and just before the final seizure had complained much of headache.

At the *autopsy* (made on the 15th), we found that the external wound was quite superficial; that the skull was not injured; that there was a copious subarachnoid serous effusion (pale) in the meshes of the pia mater; that there was a considerable quantity of yellowish serum in the ventricles; and that there was an abscess in the cerebrum, directly under-

¹ The so-called parietal arachnoid has clearly been shown by anatomical investigations, conducted with the aid of the microscope, to be the internal or epithelial layer of the dura mater, and not an independent membrane or structure.

neath the scalp-lesion. This abscess was about as large as an English walnut, seated superficially, and surrounded by softened cerebral tissue. Over it, the arachnoid membrane was glued to the dura mater, to some extent, by adhesive inflammation (circumscribed meningitis traumatica), so that in turning back the dura mater, though carefully done, the abscess was torn open. There were also distinct traces of an irregularly circumscribed extravasation of blood from small vessels (ecchymosis), apparently three or four weeks old, found in the cerebral sulci and cortex above the abscess, *i. e.*, directly beneath the scalp-injury; and, likewise, at the anterior extremity of the left cerebral hemisphere. There was, too, a flattened clot of blood, black in colour, and apparently three or four weeks old, found on the free surface of the arachnoid, in the fossa, at the base of the middle lobe of the same hemisphere. The dura mater in relation with it was somewhat thickened, roughened, and opacified. To Professor J. W. S. Gouley the present writer was indebted for an opportunity to see this patient during life and to witness the autopsy, as well as for a number of very important notes concerning the progress of the case, which have never before been published.

In this example the symptoms which arose from the cerebral contusion were irritability, moroseness, headache, loss of sensibility beginning in the right hand and fingers three days after the casualty occurred, loss of sensibility in the right foot two days later, and motor as well as sensory paralysis in these parts appearing two days still later, together with steadily increasing hemiplegia after that time. The proximate cause of these symptoms was inflammation ending in suppuration (abscess) of the bruised cerebral tissue. At the present day, scarcely any surgeon acquainted with the subject of cerebral contusion, and the liability of this form of injury to cause cerebral abscess, would fail to make a correct diagnosis while watching the progress of such a case; and, in the absence of any scalp-wound, the doctrines of cerebral localization would inform him with certainty as to the locality of the abscess. Had the nature of the cerebral lesions been correctly surmised in the example just related, and had the operation of trephining the skull underneath the scalp-lesion, and evacuating the abscess by puncture or aspiration, been seasonably performed with antiseptic precautions and antiseptic after-treatment, it is not improbable that the patient would have recovered. For Dr. Obalinski relates in the *Wiener Med. Woch.*, No. 44, a successful case of trephining which apparently belongs to precisely the same category. It occurred in a man, aged 45, who, two weeks after a wound of the head, on the left side, showed gradually increasing paralysis of the right side (hemiplegia), with augmented knee-phenomenon and some rigidity of muscle. On careful consideration, it was deemed fit to perform the operation of trephining, as it was thought probable that the symptoms mentioned were due to an abscess of the brain. The operation was done antiseptically. The dura mater was incised, some yellow matter escaping; the cavity was washed out with a one per cent. solution of thymol, drained and dressed. Some reaction followed and lasted a few days, but the patient's uncon-

sciousness and the other head symptoms soon subsided, and he left the hospital at the end of nine weeks. The paralysis and rigidity had then entirely subsided. (*Medical News*, December 30, 1882, p. 735), also (*Med. Times and Gazette*, December 2, 1882.) It is therefore clear, that, at the present day, cases of cerebral abscess arising from cerebral contusion should not be left to perish from cerebral compression, without making an attempt to save them by performing the operation of trephining and evacuating the abscess.

It is barely necessary to add that, in the pathological history of this case, as disclosed by the autopsy, there resulted from the bruising and ecchymosis of the cerebral cortex, (1) adhesive meningitis; (2) circumscribed encephalitis of a suppurative character; (3) a cerebral abscess, which caused death by compressing the brain.

CASE II. *Severe Concussion and Contusion of the Brain, caused by falling; Encephalitis; Coma; Death: Autopsy: Fissured Fracture of Skull; Ecchymosis of Cerebral Convolutions; also Diffused Subarachnoid Hemorrhage; Cerebral Abscess in the form of a so-called Cerebral Ulcer.*—Mr. C., aged about 30, was knocked down October 3, by a strong blow on his breast, his head striking the stone pavement. He was picked up completely insensible. Thirty-six hours afterward he recovered consciousness sufficiently to tell where he lived, and many facts concerning his injury. He was carried home, where he lingered with the symptoms of irritation and inflammation of the brain, until the 9th (*i. e.*, six days after the injury), when he died *comatose*.

Autopsy, by the writer, twenty-four hours after death.—Beneath the scalp on the right parieto-occipital region, a considerable quantity of blood was found diffused in the loose connective tissue under the occipito-frontalis. In the same region there was a fissured fracture of the skull, without displacement. Beneath the visceral arachnoid membrane, over all the right hemisphere of the cerebrum, blood was found extravasated in the meshes of the pia mater, so as to fill more or less completely the furrows between the convolutions of this part of the brain. Underneath the fracture, the convolutions themselves presented a bruised or ecchymosed appearance. A black clot of blood, somewhat larger than an almond, and flattened in shape, was found at the base of the middle lobe of the same hemisphere, and the parts of the arachnoid and pia mater in contact with it were so much disorganized that I could not determine whether this extravasation had occurred beneath the arachnoid or upon its free surface. The cerebral substance alongside this clot was much softened to the depth of nearly an inch, and so much disorganized that no organized structure could be discerned with the unaided eye. It was yellowish in colour, and puriform in consistence. Another, but a smaller coagulum was found at the base of the anterior lobe of the same hemisphere. This clot seemed from colour and consistence to have had a more recent origin than the other clot. The cerebral substance alongside exhibited *white* softening. The right lateral ventricle contained about two drachms of sero-sanguinolent liquid; the left about half a drachm. The dura mater was not injured, and no blood was effused between it and the fractured bone. (See also the number of this Journal for January, 1880, pp. 95, 96.)

The essential injuries in this example were the concussion and the contusions of the brain; for the cranial fracture produced no symptoms, and exerted no influence whatever on the result. In this, as well as in the preceding example, the cortex of the cerebrum, at a point corresponding to the bruise of the scalp, presented an ecchymosed appearance through an irregularly circular space, in consequence of numerous small extravasations from minute bloodvessels which had been ruptured by the force of the blow that was communicated to the brain.

But there was another patch of contused brain-substance, which was found on the base, or under surface of the middle lobe of the right cerebral hemisphere. Here, the bruised part had a depressed and shaggy surface, with sharp irregular borders, and looked not unlike an ulcer, such as has in fact been described by some surgeons "as the traumatic ulcer of the brain." The softened brain-tissue in relation with it had a puriform consistence and a yellowish colour, which were due to traumatic circumscribed encephalitis and infiltration of the inflamed part with pus-corpuscles. In other words, there was a superficial abscess of the brain. In respect to causation, the bruising of this patch of brain-substance must have been produced by *contre-coup*, *i. e.*, the bruised part must have been violently thrown against the middle fossa of the cranial base by the great force of the external blow.

Next; I shall present a case in point taken from Circular No. 3, which was issued by the Surgeon-General, August 17, 1871; and is a report of surgical cases treated in our army during the previous five years. In the sequel, I shall likewise present several other cases taken from the same source, because they are of intrinsic value, *per se*, and at the same time are not readily accessible to most readers.

CASE III. *Cerebral Contusion; Cerebral Abscess; Death; Autopsy.*—Private C. M., musician, 27th Infantry, was entered on the sick report at Omaha Barracks, March 11, 1869, as suffering from contusion around both eyes, with partial detachment of the cartilage of the septum nasi and resultant flattening of the nose—produced by a blow with the fist. The injury was attended with a good deal of epistaxis. By March 17th, he had much headache, with constipation, and the appearance of manifest debility. Active treatment was resorted to; the patient's condition varied. Death occurred suddenly on the night of April 1st, 21 days after the injury was inflicted.

Autopsy.—A small quantity of pus was found in the foramen cæcum and in the grooves for the bulbs of the olfactory nerves. The crista galli was broken off, and its apex turned toward the left. Purulent matter was found in the meshes of the pia mater on the base of the brain for three-fourths of its extent. There was a longitudinal slit in the cerebral membranes with dark edges, three-eighths of an inch in length at the anterior end of the corpus callosum, one-sixteenth of an inch to the left of the longitudinal fissure. On detaching the membranes at this point, a sinus was found leading to an abscess in the left anterior cerebral lobe, which proved to be as large as a hen's egg. It was filled with pus, broken-down

cerebral substance, and on its outer wall contained *dark grumous matter*. It communicated with the anterior cornu of the left ventricle. Both lateral ventricles, together with the third ventricle (through the foramen of Monro), and the fourth ventricle (through the aqueduct of Sylvius), were all distended with pus and disintegrated cerebral substance, with some serum. The lining of the fourth ventricle had a dusky-red colour. (*Op. cit.*, p. 123.)

The sudden termination of this case in death apparently was due to bursting of the cerebral abscess which had been formed in the anterior lobe of the left hemisphere, whereby all the ventricles of the brain speedily became filled up with purulent matter. That death did not occur at an earlier date (for the man survived his injuries three weeks) was probably due to the fact that the cerebral abscess had an external outlet through a narrow sinus, which, however, was liable to become choked with blood-clots and disintegrated brain-tissue. Moreover, any purulent matter which had made its way into the arachnoid cavity could readily escape from the skull through the part of the ethmoid bone from which the crista galli was broken off.

What caused the cerebral abscess itself? The presence of dark grumous matter within its cavity clearly indicates that its formation had commenced with an extravasation of blood; and this circumstance taken in connection with the blow on the head, which caused the disability, denotes that some small bloodvessels within the left anterior lobe of the cerebrum were ruptured by the vibrations of the brain-substance which resulted from the blow; or, in other words, that the cerebral substance at this point was contused by the same application of force which contused the external parts, with the usual consequences thereof, namely, ecchymosis and sanguinolent extravasation, developed internally as well as externally. Suppurative encephalitis ensued, and a cerebral abscess was formed.

Did space permit, I would present at length several additional examples in which cerebral contusions eventuated in cerebral abscesses, some of which were saved by the operation of trephining, and discharging the purulent matter. There is, however, no doubt that cerebral contusions very frequently give rise to cerebral abscesses.

But, does the traumatic encephalitis which arises from cerebral contusions always eventuate in suppuration? By no means; for, although this variety of brain-inflammation is a disorder of great frequency and corresponding importance, it very often, perhaps generally, proves amenable to timely treatment of an appropriate nature, as the next six examples will serve to show.

CASE IV. *Severe Concussion and Contusion of the Brain produced by falling Headforemost about seventeen feet; Recovery.*—Anne G., aged 10 years, and always healthy, was precipitated headforemost into the coal cellar of a neighbour's house, by the sudden breakage of a wooden railing against which she happened to lean, on the afternoon of September 12, 1866. She fell a distance of about 17 feet, and struck the stone bottom

of the cellar with her head and shoulders. She was picked up completely insensible, and carried home in that condition.

I was called to this patient for the first time, on the 15th, *i. e.*, three days after the accident. I found her feverish and restless, with an excited pulse, a hot skin, a furred tongue, a flushed countenance, contracted pupils, and complaining of intense headache, together with intolerance of light and sound, or, in other words, she exhibited the usual symptoms of severe inflammatory irritation of the brain, or encephalitis. Her head was warmer than the other parts of her body. On her forehead the external marks of an extensive bruise were plainly seen. She said her shoulders and back were sore, and she was indisposed to move or to allow herself to be moved on that account. A careful examination, however, showed that no part was paralyzed, and that no bone was broken. Her mother (by the way, she was a lady of more than ordinary intelligence) informed me that when she was brought home, soon after the accident, her face, eyes, ears, nose, and mouth were filled with coal-dust, that blood was flowing from her nose and mouth but not from her ears, that she remained insensible for many hours afterwards, that she vomited repeatedly during this time, that her skin was cold, and that she had not fully come to herself since the accident. Her mother also informed me that she did not rest well, that her sleep was disturbed by what appeared to be frightful dreams, which caused her to cry out, not unfrequently; that her disposition which normally was very amiable, had become fretful, sullen, and morose, and that she complained much of pain in her head. The patient had been kept quiet, and cold applications had been made to her head previous to my visit. A dose of Epsom salt had also been administered, which operated well, and afforded some relief. Prescribed the following liquid and powders: *R. Tinet. radiceis aconiti, gtt. xij; aquæ destillat. f̄ij. S. Give one teaspoonful every 4 hours. R. Hydrarg. chloridi mitis, gr. ij; sacchari albi, ʒj. Misce bene, et fiant pulv. No. 8. S. Give one powder every 4 hours.* Ordered the head to be constantly kept wet with ice-water; enjoined quietude, both mental and physical, as nearly absolute as possible, and allowed no food besides oat-meal gruel.

16th. All the symptoms are better; but the bowels having not acted since the previous day, I prescribed Epsom salt ʒss, and directed the other treatment to be continued.

17th. The headache and other symptoms of cerebral inflammation have nearly disappeared. She is quite cheerful, and says she feels pretty well. Suspended medication, excepting prophylaxis, but directed that her symptoms should be closely watched, that she should not be sent to school again for the next three months, and that I should be informed immediately if the headache or any other symptom of cerebral irritation returned. This patient apparently made a good recovery; but her sleep did not become entirely natural until more than three months afterward.

Moreover, her tendency to headache, resulting from the cerebral contusion, has never entirely disappeared. Oftentimes, since her misadventure, she has been a martyr to cephalalgia for months. Within the last year, I have been called upon by the patient to combat, with remedies, this symptom of ancient cerebral injury. She says she has never been quite free from headache since the accident occurred.

The diagnosis of cerebral contusion, as well as that of concussion in this case, was founded upon the fact that the subject fell a great distance, fully

seventeen feet, upon her head, and that, *ipso facto*, bruising of the brain-substance must, under these circumstances, always occur. Moreover, encephalitis ensued, as the symptoms clearly denoted, which could not have appeared unless there was a contused wound (bruise) of the brain itself. There was also nasal hemorrhage; and, surely, a blow on the skull strong enough to make the nose bleed must, *ex necessitate*, produce bruising of the brain.

CASE V. *Strong Concussion and Contusion of the Brain produced by falling Headforemost about thirteen feet; Recovery.*—G. N., a fine healthy boy, in the sixth year of his age, lost his balance near the top of a high flight of stairs, and fell over the balustrade down into the hall, striking the marble floor thereof with his head so forcibly as to jar the whole house. He fell a distance of about thirteen feet. He was taken up immediately and placed in bed insensible. The accident occurred on Saturday evening, November 3, 1866. Within an hour afterward I saw the patient; was informed that he had lain insensible all the time since the injury, and, furthermore, that he had vomited. I found his countenance pale, skin cool, pulse slow and weak, and he lay unconscious with his eyelids closed, as if he were in a deep sleep. He could, however, be aroused sufficiently to answer a few simple questions, but even this awakening could not be accomplished without much difficulty. Both pupils were widely and symmetrically dilated; but no voluntary muscle was found to be paralyzed. *The scalp was extensively bruised on the right side of his head.* Directed sinapisms (mild) to be applied to his feet and legs, warm flannel to be wrapped around his body, and warm tea (Chinese) to be given internally. Under this treatment the symptoms of shock gradually disappeared; and, in the course of about three hours, a moderate amount of vascular reaction occurred. Then I directed his head to be kept constantly wet with cold water, his room to be kept entirely free from noise, and prescribed a low diet, together with the following powders: R. Hydrarg. chlorid. mitis, gr. j; sacchari albi, gr. xx. Misce bene, et divide in pulv. No. 8. S. Give a powder every three hours.

4th, morning. He has rested well; still complains of headache and soreness of his shoulders and back; but he does not remember anything that occurred last night. Directed the same treatment to be continued.

5th. All the symptoms are better; but the headache has not yet entirely disappeared. Prescribed sal Rochelle, ℥iv, in sugar-water.

6th. Improving, but he is still rather dull, and has some headache.

7th. He is bright and cheerful, and free from pain. After this time, apparently, no difficulty remained. However, I directed his parents to inform me, without delay, should the headache or the restlessness, or any other unpleasant symptom return; and I discontinued my visits.

I shall barely add that the diagnosis of cerebral contusion, in this example, was based mainly upon the enormous severity of the blow which the patient's head sustained.

CASE VI. *Cerebral Contusion caused by a Violent Blow on the Head; the Symptoms continued nearly three months; Recovery.*—Emory B. C., a commercial agent, aged about sixty, but of large size and strong build, was crushed senseless down to the floor of a hall-way through which he was passing, on January 21, 1882, by the sudden fall upon his head of a

large piece of thick old plaster-work, estimated to weigh above one hundred pounds, which had suddenly become detached from a ceiling that was sixteen feet high. The blow was so strong that two of his teeth were loosened, and a third was broken off by it. His back and loins were also severely strained. He received a lacerated and contused wound of the scalp, two and one-half inches long, over the right parietal bone. He was severely stunned, and did not come to himself for some time. When I saw him, about two hours after the accident, he was still rather dull, as well as very pale, with a cool skin, and a slow, weak pulse. The scalp-wound was dressed with emplast. adhesivum, and quietude as nearly absolute as possible enjoined. The next day there was headache and other signs of cerebral irritation, with constipated bowels; advised the continuance of quietude, a spare diet, the application of cold water to his head, and a dose (℥j) of Epsom salt. But the cerebral irritation proved to be persistent. The symptoms were headache, both general and local, inability to sleep (insomnia), though constantly somnolent, sleep disturbed while it lasts by dreams, constipation, a slow, full pulse, contracted pupils, a suspicious look, an altered disposition, *i. e.*, he became morose and irritable instead of being companionable and agreeable, incapacity to read understandingly, together with giddiness, and a constant feeling of a heavy weight pressing on his brain. These symptoms persisted a long time, and but gradually disappeared. The treatment consisted in quietude of both body and mind, the use of a meagre diet, the administration of enough sal Epsom or sal Rochelle to obtain two alvine discharges *per diem*, and the application of cold water to the head.

On February 16th the following was prescribed: Hydrarg. chlorid. corrosiv. gr. ij; tinct. gentian. comp. ℥iv. Misce et solve. *Signa.* One teaspoonful three times a day, mixed in water. The use of this remedy was continued, with manifest benefit, for nearly six weeks.

On March 29th potassium iodide was prescribed in doses of ten grains in lieu of the corrosive chloride of mercury.

On April 20th I discontinued my attendance, as he had fully recovered; and he has remained well ever since.

The diagnosis of cerebral contusion, in this example, was based mainly on the character and persistence of the cerebral symptoms, for nothing less than a severe lesion of the brain-substance would have produced them. The plan of treatment prescribed was executed with great exactness; and had the treatment itself been much less active, or much less thoroughly executed, suppurative encephalitis and cerebral abscess would pretty certainly have ensued.

The next three examples will serve to emphasize two important facts: (1) that all severe concussions of the brain are very apt to be complicated with contused wounds (bruises) of the brain-substance; and (2) that such wounds of the brain-substance are in turn very apt to eventuate in cerebral inflammation or encephalitis.

CASE VII. *Severe Concussion and Contusion of the Brain; Encephalitis; Imperfect Recovery.*—Private W. R. B., Co. I, 40th Infantry, received July 2, 1867, at Fort Macon, at the hands of an escaping prisoner, two blows upon the front and right side of his head, above the temporal ridge, struck with a hammer, producing a scalp-wound, and, no doubt, contusion, as well as severe con-

ussion of his brain. He lay in a comatose state for several hours. After reaction appeared, appropriate treatment was prescribed. There was no discernible fracture. The scalp-wound readily healed. But the man suffered from headache, giddiness, loss of memory, impaired vision, confusion of thought, and was very dull of comprehension. To a casual observer, his recovery would appear complete; but the injury had left his brain in a state so unstable that it was liable to be disturbed by even a very slight excitement; he was, therefore, discharged from the service on August 21, on surgeon's certificate of disability. (*Circular No. 3, S. G. O., August 17, 1871, p. 110.*)

This case also serves well to illustrate the kinds of injury which are more especially liable to be attended by *circumscribed* contusions of the brain-substance, to wit, blows on the head inflicted with instruments of small compass, such as hammers, spent balls, stones, brick-bats, etc.; and, in such cases, the brain-wounds will usually be found situated directly underneath the point of impact of the vulnerating force upon the exterior of the skull.

CASE VIII. *Severe Bruising of the Brain; Violent Encephalitis; Recovery in four months.*—Private S., Co. H, 3d Infantry, was admitted to the post-hospital at Fort Dodge, November 17, 1868, having been knocked down by another soldier, and severely kicked and trampled upon about the head and face. The zygomatic process of the temporal bone and the nasal bones were fractured, and there was cerebral concussion of an aggravated character. When admitted, there was complete prostration of all nervous and physical powers. The means employed to bring on reaction, though used for an hour or more, seemed of little or no avail. His condition remained unchanged for eight or ten hours; shortly after midnight, when aroused and spoken to, he answered, but immediately relapsed into his former condition. On the morning of the 18th he appeared somewhat relieved; was aroused more easily, and, when sharply spoken to, would give unintelligible or irrelevant replies. His face was greatly distorted by the swelling, his eyes completely closed, and there were several cuts upon his forehead and face. During the day violent inflammatory symptoms, pointing to brain-trouble, set in. He became exceedingly restless, and tossed himself about so violently that it was necessary to hold him down in bed; cold applications were made to his head, a sinapism was put on the back of his neck, and a blister behind each ear. This condition lasted about five days, when he gradually became more calm; but his mental faculties were much impaired. During December and January, however, he slowly improved, and in March, 1869, he was returned to duty. (*Ibid.*, p. 124.)

Concerning this example, it is worthy of special remark that the symptoms of cerebral contusion presented themselves in an unusually distinct manner; for there was "complete prostration of all nervous and physical powers" (*i. e.*, intense shock), which lasted some eight or ten hours or more, then somnolency or hebetude with incoherence for several hours, followed by extreme restlessness and wild or violent tossings of the body, which were with much difficulty restrained. In respect to the symptoms, this example may justly be considered as typical.

CASE IX. *Contusion as well as Concussion of the Brain; Recovery.*—Private P. E., Co. B, 42d Infantry, was brought to hospital at Plattsburg, N. Y., about 6 o'clock P. M., April 9, 1867, in an unconscious condition, and bleeding profusely from a wound of the head, produced by a blow from a musket in the hands of an intoxicated soldier. On examination, a lacerated wound, one inch in length and one-fourth of an inch in depth, was found on the right orbital ridge; also, a slight tumefaction in the right temporal region. Blood was slowly oozing from

his nose and mouth; his eyes were turned upward and fixed; pupils contracted and insensible to light; pulse feeble; countenance pallid; surface of body (skin) cold. His breath had a decided alcoholic odour, indicating that some degree of inebriation might be present. The *treatment* consisted in applying a sinapism to the spine, with bottles of hot water to the feet and body, and cold water to the head. At 11 o'clock there were symptoms of reaction; he answered questions, though rather confusedly, and complained of great pain in his head. He was kept quiet, and the treatment continued. He slept a little during the night, but was restless at intervals. The next morning he appeared quite sensible; pulse 76, and stronger; skin hot and dry; considerable thirst, and no appetite; complained of some frontal headache. Continued cold water to his head, and gave potassic nitrate, gr. iv, every two hours. During the day, the febrile symptoms subsided, and during the night he slept without interruption. Henceforth, this soldier rapidly improved; on the 18th he was dismissed from hospital and returned to duty. (*Ibid.*, pp. 110, 111.)

Dr. Samuel Wilks, of Guy's Hospital, has reported the following example, which will answer well to illustrate the possible consequences (remote) of cerebral contusions, and the *post-mortem* appearances of the bruised cerebral tissue after the lapse of several years:—

CASE X. "*Epilepsy; Old Injury of the Brain.*—A man, æt. 43, was admitted suffering from epilepsy. Between two and three years before he had fallen on the back of his head, and, a year before, he had had a fit for the first time. On the morning of his admission it was observed by his fellow-workmen that his appearance underwent a sudden change, that his face became contracted, and that blood flowed from his mouth. He afterwards had another fit, and was brought to the hospital. He was then quite insensible, the pupils dilated, the respiration labouring, the cheeks blown out, etc. The fits continued with scarcely any intermission; he afterward appeared to be paralyzed on the left side. The *post mortem* showed clearly that the brain had at one time received a severe contusion; the surface of the anterior part (which would suffer from *contre-coup*) presented a brown or ochrey colour from effused blood. This condition extended into the cineritious substance. The anterior lobe was adherent to the dura mater, and so was the under surface of the left lobe." (*Guy's Hospital Reports*, 1866, p. 233.)

The epileptiform convulsions and chronic cephalalgia terminating in death by coma, and the *post-mortem* lesions which characterized the bruised brain in this case, do not seem to require any additional remark.

But, before leaving this branch of the subject, a brief paragraph should be devoted to an important class of cases, much less acute than the foregoing, which, hitherto, have received but scanty mention. For instance: A labourer receives a blow on the head from the sharp corner of a stone or a brick-bat, which knocks him down. He is considerably stunned for the moment, but soon rallies, and gets up without assistance. His scalp is found to be slightly wounded, but there is no fracture. Although he has considerable pain in the injured part, and is quite giddy, he at once returns to his work; and, although his headache, etc., persist, he still continues to work. The wounded scalp readily heals. He goes on in this way some two or three weeks, perhaps longer; then he suddenly becomes seized with intense cephalalgia and rigours, rapidly followed by hemiplegia and coma; or, the paralysis and insensibility may supervene without rigours and without any great increase of headache. Death soon ensues, and the autopsy reveals directly beneath the cicatrix of the scalp-wound

the traces of a circumscribed ecchymosis in the pia mater and cortical substance, and deeper still a cerebral abscess. Such cases are reported from time to time; and it is my belief that they are much less rare than is generally supposed. Moreover, such cases may be saved by the operation of trephining and evacuating the abscess by puncture or aspiration, as has been done with success in analogous instances by Dr. J. F. Weeds, by Mr. Holden, and by Mr. Hulke, as well as by Dr. Obalinski, as stated above; especially if antiseptic precautions, and antiseptic dressings (with adequate drainage) be also employed. In all such cases, a much more considerable bruising of the brain has occurred than the degree of cerebral concussion would at first seem to imply.

In the example which was last related the contusion of the brain-substance was produced by *contre-coup*, *i. e.*, it occurred on the side of the head opposite to that which struck the ground in falling. This circumstance brings fairly before us the whole subject of cerebral contusion by *contre-coup*; and I propose to present next whatever facts concerning it may seem to be possessed of practical importance.

Hennen relates a case in which contusion of the brain by *contre-coup* was produced by falling on the head: A soldier, "being very much intoxicated, fell from the top of the stairs leading to his barrack-room, consisting of seventeen steps," on the night of December 5, 1818. He was picked up "in a state of complete coma;" pulse "slow, full, and strong, but very irregular;" pupils natural; breathing "in some degree stertorons," being performed, "as is frequently done in sleep, through the nose, but with the mouth open." There was "a small lacerated wound" in the scalp over the posterior superior part of the right parietal bone, "but without any tumefaction to prevent the most accurate examination of the subjacent bone. Neither at this point nor any other can any fracture or depression be discovered in the bone." Nevertheless, he sank and died on the night of the 7th, without recovering consciousness.

Necroscopy.—The only mark of violence which appeared externally was the small scalp-wound just mentioned, with some bleeding from the nose and right ear.

"The upper part of the cranium being removed in the usual manner, discovered that portion of the dura mater lining the left half of the frontal bone (and which was *diametrically opposite* to that in which the wound in the external integuments was situated), tensely distended, and of a deep purple colour from the blood effused underneath it. The upper portion of the dura mater being removed by a circular section corresponding with that of the bone, a very considerable quantity of coagulated blood was found upon this part of the surface of the brain, and part of the cerebral substance itself appeared disorganized, and blended with this grumous mass."

The autopsy also revealed much bruising of the right temporal muscle,

and extensive fractures of a fissured character in the right temporal and parietal bones, with a considerable quantity of blood effused between these bones (especially the former), and the dura mater lining them. No derangement was to be discovered in the internal structure of the cerebrum or cerebellum. (*Principles of Military Surgery*, pp. 265-267, Am. ed.)

In this example the contusion of the cerebral substance by *contre-coup* was very well marked; for the anterior lobe of the *left* cerebral hemisphere, at a point directly opposite the scalp-wound over the posterior part of the *right* parietal bone, was so much disintegrated by the force of the *counter-stroke* that it "appeared disorganized, and blended with the grumous mass" of extravasated blood which covered it, the extravasation being collected in very considerable quantity in that part of the left arachnoid cavity, as well as in the meshes of the pia mater at the place of cerebral injury, the viscerai arachnoid itself being lacerated.

The proximate cause of this man's death was compression of the brain produced by extravasated blood. The compression of the left cerebral hemisphere was exerted by the blood which had been effused into the cavity of the left arachnoid membrane, and into the corresponding furrows between the cerebral convolutions, from the torn and crushed vessels of the parts of the pia mater belonging to the focus of cerebral contusion. The compression of the right cerebral hemisphere was produced by the blood which had been poured out into the space between the right temporal and right parietal bones, and the dura mater underneath them, from the middle meningeal artery (or its branches) which had been torn open by the fissured fractures of these bones. These fractures were not recognizable during life because they were not attended with depression, nor any displacement.

The lesions revealed by the autopsy satisfactorily explain the symptoms which were developed during life. The state of unconsciousness which resulted from the cerebral concussion, produced by the fall, passed directly into that which resulted from the cerebral compression, produced by the extravasated blood; hence, the patient at no time after the accident recovered his senses. Both cerebral hemispheres were simultaneously compressed; therefore hemiplegic symptoms did not appear, as they would have done had only one of the hemispheres been subjected to the pressure. This example is so highly instructive, as well as interesting, that no apology for its presentation can be needed.

CASE XI. *Contusion and Laceration of the Brain by Contre-Coup; Death; Autopsy.*—Private U., cavalry detachment, United States Military Academy, West Point, was admitted to this post hospital December 23, 1870, at 9 o'clock, P. M., in a state of unconsciousness, and bleeding profusely from the left ear, having fallen down stairs upon his head while intoxicated. There was, however, no wound or swelling discernible on the scalp to indicate the point of impact, and the external examination revealed nothing. Pulse 70, full but compressible, and intermitting twice per minute; respirations 16, heavy and stertorous, like

those of drunkenness; pupils dilated (somewhat), but respondent to light. He was extremely restless, and required two attendants to keep him in bed; he muttered incessantly and unintelligibly through the night. Shortly after admission to the hospital, the aural hemorrhage subsided to an oozing, which continued as long as life lasted. The blood was chiefly arterial; no serum could be discerned. To his head cold applications were made, and his extremities were kept warm by hot bottles.

24th. Patient still unconscious; pulse 54, full, compressible, and intermitting, the same as last night; pupils slightly but equally dilated, and responsive to light; temperature 98° ; respirations 16, and their character unchanged; restlessness continues; he is constantly attempting to get out of bed, and is restrained only by the employment of much physical force by his attendants; he mutters incessantly. His bowels were moved by enema unconsciously. His bladder was evacuated unconsciously twice during the day; urine normal in colour and quantity. He was unable to swallow; beef-tea was administered by injection.

25th. No perceptible change; pupils moved, and urine voided involuntarily; still muttering and restless. Upon being slapped quite smartly on his cheek with the fingers, he uttered an expression of disgust in a single word —, the only evidence of consciousness which he exhibited after the accident. Beef-tea and brandy, largely diluted, were injected every two hours, as he could not swallow.

26th. 6 A. M., pulse 66; respirations 17; temperature 98° ; restlessness continues: patient rolls unconsciously from side to side, and frequently attempts to get out of bed. 12 M., pulse 50; respirations 16; temperature 100° . 4 P. M., no change worthy of mention. At 8 P. M., reaction set in violently; pulse 150; temperature 105° ; respirations variable, from 14 to 19. From this hour he sank rapidly; his pulse rose to 200. At 5 A. M. on the 27th (on the fourth day after the accident) he died. The decubitus of this patient was either dorsal or left lateral, but chiefly the latter. The jactitation was the most prominent symptom throughout.

Autopsy.—Beneath the scalp an extensive extravasation of blood was found, chiefly on the left side, but no clots. At the left parietal eminence there was a slightly depressed fracture, with fissures extending into the petrous bone. At the point of direct impact the outer table was driven into the diploë, and exhibited two fissures, crossing at right angles, an inch and a half and an inch in length, respectively. The inner table was very slightly depressed at the same point. Extending from this depression to the auditory canal there was a broad fissure which passed through the petrous bone. When the skullcap was removed, a blood-clot, nearly circular, two and one-half inches in diameter by half an inch in thickness at the centre, was found immediately under the depression, and lying between the bone and the dura mater. Dark fluid blood mixed with serum, estimated at six ounces, escaped from the opened skull.

Immediately under the right frontal protuberance, at a point diagonally opposite the depressed fracture (the force of the blow having evidently been transmitted from behind forward and obliquely toward the right), the surface of the brain was found lacerated and contused by *contre-coup*, over a space and to a depth nearly equal to the dimensions of the blood-clot above described. (*Circular No. 3, S. G. O., August 17, 1871, p. 126.*)

The contusion of the cerebral substance in this example had no direct relationship with the fracture of the cranium. Each of these lesions, however, was simultaneously caused by the same violent application of force, although they were developed on opposite sides of the head. Moreover, this case presents one of the most remarkable instances of contusion of the brain by *contre-coup* with which I am acquainted.

The symptoms of "shock" lasted a very long time, for the temperature remained below the normal almost three days. The observation that "jactitation was the most prominent symptom throughout" is worthy of

being specially recalled to mind, as being one of the most important of all the phenomena which result from contusion and laceration of the brain.

In the number of this Journal for July, 1866, page 74, Dr. John Ashhurst, Jr., reports a note-worthy case of contusion and laceration of the brain by *contre-coup*, produced by falling from the third-story window of a dwelling-house. The patient died three days afterward at the Episcopal Hospital. "An *autopsy* was made five hours after death with the following results: His scalp was infiltrated with blood, and, when raised, displayed a fracture involving the orbital plate of the frontal bone, with the temporal and sphenoid bones on the *left* side. The membranes were congested at the seat of fracture, and there was considerable *laceration* and *contusion* of the *brain* at the *base* on the *right* side, directly opposite the seat of fracture, and apparently produced by the *contre-coup* or counter-stroke of the older writers."

We conclude as follows: (1) It is of some practical importance to know that contusions of the brain by *contre-coup* are very frequently met with in cases where the injury has been caused by falling on the head, as the foregoing examples clearly attest, and several additional instances of the same sort will be mentioned in the sequel. If I were to judge from my own experience I should say that, in a large majority of the instances where contusion of the brain is produced by falling on the head, it is caused by the *counter-stroke*, and presents itself on the side of the head opposite to that which receives the blow.

(2) In accounting for the energy of the *counter-stroke* in such cases it should be remembered that the brain does not completely fill the cranial cavity; for there is a considerable space surrounding it, embraced for the most part in the meshes of the pia mater, which is constantly filled with cerebro-spinal fluid. Indeed, the base of the brain rests upon and is supported by this fluid to such an extent that Mr. Hilton has quite properly called it "the perfect water-bed of the brain." (*Rest and Pain*, p. 16, Am. ed.)

(3) Cerebral abscesses sometimes form on the side of the head opposite that which has been struck, in consequence of injury by *contre-coup*. Thus, Bartholin saw a blow on the head followed by an abscess on the other side; and, when a blow has been received on the upper part of the head, the abscess will sometimes be found near the base of the brain. In a case of this sort reported by Pigray the abscess was very small, and did not prove fatal until six months after the accident. When a cerebral abscess arises from injury of the brain by *contre-coup*, it generally causes some symptoms which should excite a suspicion of its presence. These symptoms are fixed pain at the seat of injury by *contre-coup*, paralysis of an arm or a leg, and even complete hemiplegia on the side of body opposite the seat of fixed pain in the head, *i. e.*, on the *same* side of the body as the part of the head that received the blow, together with irregular

shiverings and fever. The doctrines of cerebral localization may also furnish important aid in determining the site of such an abscess. Should the diagnosis of cerebral abscess by *contre-coup* be clear, the operation of trephining and evacuating the abscess by puncture or aspiration (if practicable) would be demanded; "and, in honour of the ancients, we may cite the case related by Amatus, who applied the trepan to the part of the head opposite to the wound, when he found that the symptoms were not relieved by applying it on the side wounded, and that the patient suffered from severe pain on the other side; this second trepan proved very apropos, for it allowed the escape of pus which had collected under the skull. (*Memoirs of the Royal Academy of Surgery of France*, Syd. Soc. translation, p. 21.) The patient made a good recovery.

But we must not overlook the terrible cases of cerebral contusion in which, in consequence of the laceration of bloodvessels (in the pia mater) having a considerable magnitude, blood is poured out with great rapidity, as well as in great quantity, and death by compression of the brain speedily ensues. In such cases the extravasated blood is found, on examination post mortem, either (1) in the arachnoid cavity, or (2) in the subarachnoid space, *i. e.*, in the meshes of the pia mater and in the furrows of the brain, as has already been intimated on a previous page. I shall illustrate each of the varieties by a few examples of a typical character selected from my note-book. But, inasmuch as these cases are utterly irremediable, I shall offer but few comments concerning them. I should, however, state at the outset that these cases are of very frequent occurrence; were it otherwise, I would not take space to consider them.

CASE XII. *Cerebral Contusion by Contre-Coup; Insensibility; Epileptiform Convulsions; Coma; Death; Autopsy; Profuse Hemorrhage into the Arachnoid Cavity, etc.*—Bernhart U., aged 45 years, a tailor, said to have been grossly intemperate for years, injured his head by falling backward upon the pavement, about 10 P. M. November 4th. He was picked up insensible, and carried home. There was a contused and lacerated wound of the scalp, which bled freely. About midnight convulsions supervened, and continued until 7 o'clock A. M. on the 5th, when he died comatose, having remained insensible from the beginning. The convulsions were intermittent, the interval between them being about twenty minutes. His friends, supposing him to be only grossly intoxicated, did not bring a physician.

Autopsy by the writer (for the coroner) eight hours after death.—Cadaver pale, stout, and fat. On the back part of his head, over the rear end of the *left* cerebral hemisphere, was found a contused and lacerated wound of the scalp, about one inch in length; scalp itself congested. His skull was thick and eburnized, but not injured. A considerable quantity of bloody serum escaped from the cranial cavity while the skullcap was being sawed off. In the arachnoid cavity, above and in front of the *right* cerebral hemisphere, about three ounces of fluid and coagulated blood were found; this coagulum exhibited the greatest thickness upon the frontal end of the hemisphere. In the meshes of the pia mater, underneath the arachnoid, a considerable quantity of bloody serous effusion was found on

the whole convex surface of the *right* cerebral hemisphere. A larger quantity of pale, limpid serum was found effused beneath the arachnoid investing the left cerebral hemisphere, which filled the sulci, distended the pia mater, raised up the arachnoid itself, and gave it a pale, jelly-like appearance. No blood or bloody serum was found on the left hemisphere. The substance of the brain was remarkably firm in consistence throughout and congested, but its colour was normal. The ventricles contained nearly two ounces of bloody serum. It is probable that the chronically congested state of the scalp, the chburnized condition of the skull, the indurated, shrunken, and chronically congested state of the brain just described, had resulted from the long-continued action of the alcohol with which his circulating blood had been heavily and habitually charged for years. I was informed that he had consumed a bottleful of gin every day for a long time.

CASE XIII. *Cerebral Contusion by Contre-Coup caused by a fall; Insensibility; Coma; Death; Autopsy; much extravasated Blood found in the Arachnoid Cavity, etc.*—Margaret T., apparently middle-aged, injured her head severely by falling backward thereon, September 22d, and was picked up in an insensible condition. A few hours afterward she died, with the symptoms of a fatal compression of the brain.

Autopsy by the writer (for the coroner).—Right pupil dilated; left one natural. While dissecting off the scalp, a large bruise was found on the back part of the head, a little to the *left* of the median line, *i. e.*, over the posterior extremity of the *left* cerebral hemisphere. The skull was not injured. On removing the skullcap and dura mater, a large quantity of blood, both fluid and coagulated (more than four ounces), was found on the free surface of the arachnoid membrane, spread over the convexity of the *right* cerebral hemisphere; but the layer of coagulum was thickest over the anterior lobe (particularly at the anterior extremity thereof), and it was thicker over the middle lobe than over the posterior one. The source of this hemorrhage could not be found. No hemorrhage upon nor within the left hemisphere, nor in any other part of the brain. The ventricles were nearly empty. The substance of the brain appeared throughout to be normal in colour and consistence. The organs of the thorax and abdomen presented no abnormality worthy of mention in this connection. There were no anatomical evidences of alcoholism.

In the last two examples the extravasation of blood was due to the laceration of some important vessels of the pia mater, attended with corresponding rents in the arachnoid, which was caused by the bruising from a *counter-stroke* of the part of the cerebral membranes from which the hemorrhage occurred. In both alike the unfortunate subject received a violent blow on the head at a point corresponding to the posterior extremity of the *left* cerebral hemisphere, the shock, impulse, or vibrations arising from which were directly communicated to the contents of the skull, although the skull itself was not broken, and were transmitted obliquely through the centre of the brain, in a straight line, to the inner surface of the *right* frontal bone, against which the anterior lobe of the *right* cerebral hemisphere was violently projected by the transmitted force or vibrations, and in such a manner as to lacerate its small superficial bloodvessels, together with the arachnoid membrane, at the point thereon where the *counter-blow* from the *right* frontal bone reacted with the greatest energy. Therefore, in both instances alike, the hemorrhage was restricted to the space surrounding the *right* cerebral hemisphere, and the flattened coagulum resulting therefrom was found to have its greatest

thickness on the front part of the anterior lobe, at the place where the bruising and laceration occurred, and from which the extravasated blood itself was poured out.

CASE XIV. *Extravasation (profuse) of Blood beneath the Visceral Arachnoid Membrane, caused by Cerebral Contusion without Fracture; Sudden Death; Autopsy.*—Mrs. Mary M., aged 35, said to have been badly beaten by her husband on the afternoon of March 12th, was found lying dead upon the floor of her apartment in a house occupied by several families at 6 o'clock P. M. on the second day. Her hair was dishevelled and dress disordered. The precise time when death occurred is not known. She had, however, probably been dead for more than an hour, as her body was already cool when it was discovered. Her habits were temperate, and she was nursing a young child.

Autopsy by the writer eighteen hours (about) after death.—Rigor mortis very slight. Fresh bruises were found on the back of the left hand and wrist; also upon the face, and especially on the left eyelids. While dissecting off the scalp the marks of a severe contusion were found over the right temporal muscle. The tissue of this muscle was infiltrated with fresh blood to considerable extent. On removing the skullcap and dura mater, and exposing the surface of the brain, a large quantity of extravasated blood was found beneath the visceral arachnoid membrane in the meshes of the pia mater. This sanguinolent effusion was spread out over the left temporal region, the anterior portion of both cerebral hemispheres, the right temporal region, and the base of the brain. It was more abundant about the medulla oblongata and the cerebellum than elsewhere. It was also more abundant in the left than in the right temporal region. The blood lying in the furrows of the brain, in the fissure of Sylvius, and upon the medulla oblongata was coagulated. The quantity of this sanguinolent effusion, both fluid and coagulated, was estimated at more than half a pint. The lateral ventricles contained a little bloody serum, and the right one also a small coagulum. The substance of the brain seemed to be somewhat softer, or less firm than natural, throughout its whole extent. The substance of the brain was not lacerated in any part. It also did not contain any extravasated blood. The sanguinolent effusion was found on the surface, and in the right ventricle, but not elsewhere. The skull was not fractured. It was carefully examined. The lungs, heart, liver, and spleen were natural. The stomach contained six or eight ounces of partially digested food. The organ itself was natural. The kidneys looked healthy. But the muscular tissue generally appeared to be somewhat softened. As already stated, she was giving suck to a young child at the time of her death.

CASE XV. *Copious Extravasation of Blood beneath the Visceral Arachnoid Membrane, caused by Cerebral Contusion without Fracture; Subject found Dead; Autopsy; Heart Hypertrophied; Lungs Congested; Liver and Kidney Granular; Spleen Enlarged, etc.*—Wm. F., æt. about 49, but looking considerably older, after being unwell about a week (he had been rather feeble for a much longer period, but not confined to his room at any time), was found sitting on a box in his room quite dead, on the morning of March 16th. His face, or rather the left side of his head and face, was covered with dried blood. The hair on the left side of his head was matted together with dried blood, which had flowed from a wound of the scalp. The authorities tried diligently but in vain to ascertain how he had been injured.

Autopsy by the writer, March 17th, at nine o'clock A. M.—Cadaver emaciated and jaundiced (light-yellow), and without post-mortem rigidity. Recent bruises were found on the left arm, left shoulder, left side of the neck, and the nose. On dissecting off the scalp *the marks of a severe contusion were found on the left side of the head*, above the left ear, and over the origin of the temporal muscle. *The texture of the scalp was disintegrated*, as it would be by a strong blow with a blunt instrument, through a space rather more than three-fourths of an inch in diameter. There were marks of several lighter bruises in the same locality, and the tissue of the temporal muscle was infiltrated with fresh blood to considerable extent. On removing the skullcap and the dura mater, *blood was discovered to be extensively effused beneath the visceral arachnoid membrane*, in the left temporal region, at the base of the anterior lobes (both) of the cerebrum, and on the anterior surface of the medulla oblongata. This blood was coagulated, and in the fissure of Sylvius the clot was half an inch in thickness. The substance of the brain was of firm consistence in every part, and did not contain any extravasated blood. The lateral ventricles, however, contained a small quantity of serum tinged with blood. The skull was not broken.

The *lungs* exhibited some emphysema (vesicular), and were somewhat congested with venous blood. In the apex of the right lung some deposits of tubercular matter were found, which were undergoing the process of repair. They were surrounded with a distinct membranous envelope or capsule. They were also of the consistence of dry hard cheese, white in colour, and softer at the centre than at the circumference. Some of them were infiltrated to greater or less extent with pigmentum nigrum.

The *heart* was hypertrophied, and much larger than natural. The mitral and one of the aortic valves were somewhat thickened. Both cardiac chambers contained clots.

The *liver* was much enlarged and flattened in shape. It was also granular in appearance and feel externally. On section the structure was found to be coarsely granular. The granules varied in size, but the abnormality was uniform in every part of the organ. The hepatic tissue was brittle, and weaker than natural. The quantity of blood contained in the organ was smaller than natural.

The *spleen* was much enlarged. It measured six inches in length, five inches in breadth, and three inches in thickness. It weighed one pound and six ounces. Its consistence was normal. On section it presented a reddish-brown colour, with numerous white or yellowish-white spots, of the size of a pin's head, thickly and uniformly scattered over the cut surface. These spots were the divided trabeculae of the organ.

The *kidneys* also were much enlarged. The cortical portion of each organ contained an abundant quantity of a yellowish-white substance, having a firm consistence. In the left kidney this substance was infiltrated uniformly throughout the cortical portion. In the right kidney, in addition to said infiltration of the cortical portion, two yellowish-white spots were found, one near each end of the organ, which had been produced by a filling up of two pyramids with a semi-cartilaginous substance infiltrated into the tubular structure.

The *stomach* contained a few ounces of fluid tinged with bile. The organ itself was natural.

Beneath the *contusion on the left side of the neck*, mentioned above, the connective and even the muscular tissues were found to be infiltrated with blood to considerable extent.

The lesions presented by the liver, spleen, and kidneys in this case, but especially those of the last-named organ, are very interesting, and, therefore, I have not "cut out" the description of them, although they probably had little (if anything) to do with the subarachnoid extravasation of blood which resulted from the traumatism.

CASE XVI. *Contusion of the Pons Varolii and Crura Cerebri, caused by falling on the Head; Death: Autopsy; much Blood also found in the Arachnoid Cavity.*—Mrs. Catharine T., aged 36, died rather suddenly on December 19th, from an injury of the head, caused (most probably) by falling thereon. Her circumstances in life were comfortable, and she had borne several children. Nevertheless, her relatives informed me that for eight years she had been a toper, and for three years a drunkard. Her death was preceded by coma and stertorous breathing.

Necroscopy by the writer, December 20th, 1 P. M.—Cadaver fat, and presented a jaundiced hue (yellowish). There were marks of bruises found on the forehead and hairy scalp, on the right side of the face and lower jaw, on the breast, arms, and legs. The largest, however, was on the lower jaw. Skull not broken. On removing the skullcap and dura mater, about four ounces of coagulated blood were found in the left arachnoid cavity, lying upon the anterior and middle lobes of the left cerebral hemisphere, which had correspondingly depressed and flattened the cerebral convolutions. The ventricles held a little pale fluid. The central portions of the pons Varolii and crura cerebri were softer than normal, and contained some extravasated blood. The softened brain-substance was stained with blood, it being dark-red in the centre, next to that reddish-yellow, then yellow, and, finally, yellowish-white in colour at the circumference. The other parts of the brain were all quite firm in consistence, and normal in colour. The source of the meningeal hemorrhage could not be determined. There was no appreciable laceration of the meninges. The contusion of the brain-substance was apparently restricted to the pons and crura cerebri, as above described. Externally, these structures presented a perfectly normal appearance.

Inasmuch as this patient's history was that of confirmed alcoholism, it may be both useful and interesting to describe the morbid appearances which were presented by the other internal organs. They were such as usually arise from chronic alcoholism.

The *lungs* were congested and emphysematous. The left one contained a few small tubercles. There were no pleuritic adhesions. On the exterior of the pericardial sac an abundant quantity of adipose tissue was found.

The *heart* was large and fatty externally. On the right ventricle the lamina of adipose tissue had encroached considerably upon the muscular structure of the organ. In some spots it extended almost through the ventricular wall to the endocardium. Under the microscope some muscular tissue taken from the right ventricle was seen to present fibres that were perfectly healthy with adipose tissue of the usual kind, *i. e.*, consisting of little sacs filled with oil, dipping down between them. The muscular tissue of the left ventricle presented a natural appearance under the microscope.

The *liver* was enlarged to about twice its normal size and fatty. It had a lemon-yellow colour that was nearly uniform in every part of the organ. The edges of the right lobe especially were well rounded off. The hepatic tissue was hard in feel and brittle in consistence.

The *spleen* was softened and darker in colour than natural, but presented no other abnormality.

The *kidneys* were large in size, firm in consistence, and congested; but portions of their cortical substance (spots) presented a colour that was paler than natural, and paler than the rest of the cortical structure. Under the microscope these whitened parts of the cortical substance were seen to contain decidedly more fat globules than the unwhitened parts; but even in the last mentioned there was more than the normal quantity of fat globules. The slide prepared from the whitened parts exhibited the fat vesicles aggregated into patches in some portions of the field, while they were scattered and isolated in other portions.

The mucous membrane of the *stomach* was mamelonated, thickened, and softened. It exhibited punctiform injection along the lesser curvature, but elsewhere its colour was uniformly pale, *i. e.*, white, slightly tinged with a yellowish ashy hue. The gastric mucous membrane bore no inconsiderable resemblance to rotten leather, having a dirty yellowish-white colour.

The *uterus* exhibited old fibrous bands of adhesion upon its exterior, the results of a circumscribed inflammation of the peritoneum, which had occurred long previously. One Fallopian tube was dropsical; it was bent downward and fastened to the womb by old adhesions; it was also constricted at several points, and on that account presented a lobulated or bead-like appearance. In the ovaries some of the Graafian vesicles were dilated into cysts, but none of them had reached any considerable size.

The *bladder* was distended with urine, which had accumulated after coma supervened.

The lesions which are most characteristic of chronic alcoholism were well shown in this case. They are briefly as follows: A mamelonated, thickened, softened, dirty yellowish-white, or rotten leather-like condition of the gastric mucous membrane, with patches of punctiform congestion; an enlarged, fatty, and flabby heart; a greatly enlarged and fatty liver, with inflammatory thickening of Glisson's capsule; enlarged and fatty kidneys; a disordered spleen; and an excessive deposit of fat in the general connective tissue, especially about the abdomen and thorax.

But the most important features of this example, for our present purpose, were the contusions of the pons Varolii and crura cerebri. There are but few instances of this form of injury on record. Mr. Prescott Hewett states (*Holmes's System of Surgery*, vol. ii. p. 312) that only five cases belonging to this category were met with at St. George's Hospital, within the space of sixteen years. In an example mentioned by M. Boinet (*Archives Gén. de Médecine*, 1857, p. 50), the centre of the pons was bruised, and this was the only injury of the brain-substance which was discerned. In another example mentioned by M. Fano (*Rech. sur la Cont. du Cerv.*, obs. xii. p. 25), the parenchyma of the pons was studded with a number of small sanguinolent extravasations, about the size of a split pea, while the anterior lobes of the cerebrum were extensively bruised and lacerated, although the cranium was not fractured. The case related above, however, shows that the centre of the pons Varolii, as well as that of each

crus cerebri, may be broken down by a traumatic extravasation of blood, while the exterior of the injured organ presents no morbid appearance whatever. Obviously, such a lesion might readily elude detection, unless particularly sought for. Obviously, too, this example of brain contusion should be permanently recorded, because of its extreme rarity.

CONTUSIONS OF THE SPINAL CORD.

CASE XVII. *Contusion of the Spinal Cord, caused by a blow on the back from a falling tree; Paraplegia; Death six days after the accident; Autopsy; Linear Fracture of the first and second Dorsal Vertebrae (i. e., fracture without displacement) also present.*—Private John H. Rhodes, Co. A, 6th Pennsylvania Cavalry, aged 22, and always healthy, was brought to the Dépôt Field Hospital at City Point from the front, in a paraplegic condition, December 14, 1864, where I saw him on the following day, and inquired into his case with much care. His mind was not at all affected; he said his disorder had resulted from an injury. On Sunday, December 11, while lying on the ground face downwards (his troop was posted in the woods at the time) a tree fell, and some branches belonging to its top struck him violently across the back and shoulders; he was instantly deprived of the use of his lower extremities and the lower part of his body. On examination I found that there was complete paralysis, both sensory and motor, of all the parts below the umbilicus. The detrusor urinæ muscle being paralyzed catheterization was required twice daily; urine ammoniacal, and more abundant (in quantity) than normal. No motion of the bowels since the accident (four days before). Reflex motor action in the lower extremities was entirely suspended; for, on tickling the soles of his feet, and pulling the hairs of his legs, thighs, and groins, I failed to excite any motor reflex, as well as any sensibility; both lower extremities were alike in these respects. Above the umbilicus sensibility shortly began to be discerned, at first faintly, but with increasing distinctness on proceeding upward, until it became normal on the upper part of the thorax. The respiration was abdominal (i. e., diaphragmatic), and superior thoracic (i. e., superior intercostal). He had good use of the upper extremities (both), and made no complaint about them whatever. He was now carefully turned over upon his right side, so as to permit an examination of his back. It was then discovered that a consistent stool had just been passed spontaneously and unconsciously by him in bed. There was no appearance of contusion nor ecchymosis on his back and shoulders; there was no deformity of the spinal column manifested to the eye. On careful exploration of the vertebral spines with the fingers no abnormal mobility of these processes was anywhere present. It was thought, however, that the extremity of the fifth dorsal spine was less prominent than the extremity of the fourth, and that it deviated slightly toward the left (about two lines). At the upper part of the dorsal region there was tenderness (moderate) under pressure upon the vertebrae (first two or three dorsal) discerned. He did not complain of feeling hurt in any part while being turned over in bed; did not complain of distress in any part of his body. He had considerable cough, with expectoration; sputa unstained; his face had a dusky hue (not deep). He said his cough was better than it had been; and he thought he had taken cold; no difficulty in swallowing solids as well as liquids; no priapism. The patient grew worse; his breathing became more and

more difficult; and on the 17th he died from failure of the respiratory function, six days after the casualty occurred.

Autopsy, Dec. 18.—Rigor mortis strong; body muscular and well developed; no deformity of spinal column discernible on external examination. While dissecting off the dorsal muscles in order to expose the spinal column a small quantity of extravasated blood was found among the fibres of these muscles in the neighbourhood of the three upper dorsal vertebræ, but there was no cutaneous ecchymosis. There was a fracture of the first and second dorsal vertebræ, with but little, if any, displacement of the fragments. It passed through the body of the second and the laminae of the first. The anterior vertebral ligament was slightly lacerated opposite the fracture. The posterior vertebral ligament was not torn; but it was detached (loosened) to some extent around the fracture. External to the theca vertebralis, between it and the bone, some coagulated blood was found opposite the fracture. It constituted a thin, narrow strip, about two inches in length by one-fourth of an inch in breadth; it extended along the left side of the theca, and exerted no pressure whatever on the cord. Within the theca no blood nor bloody fluid was found. Externally the spinal cord presented a normal appearance, *i. e.*, its exterior was not discoloured, nor lacerated, nor notched by compression. On making a longitudinal section, however, the gray substance within the cord was found to present an ecchymosed and bruised appearance opposite the site of the vertebral fracture; the gray substance here was dark-brown in colour, in consequence of its infiltration with blood which had escaped from the ruptured capillaries; and it was also pulped by the force of the contusion. This pathological condition of the gray matter was restricted to the locality of the vertebral fracture. It was also symmetrical in both lateral halves of the cord. As before stated, the exterior of the cord presented no abnormal appearance whatever to the eye in even this locality; no inflammation of the membranes or substance of the spinal cord. The spinal column exhibited slight lateral curvature, the convexity being on the right side.

Thorax. No ribs were broken; no pleuritic adhesions; both lungs alike contained more than the normal quantity of blood from passive hyperæmia, but otherwise were sound. The pericardium contained about one ounce of serum stained with blood (*post-mortem*); heart normal; abdominal organs normal.

The part of the spinal cord which is most apt to suffer from contusions is the gray substance of its interior; and, therefore, it not unfrequently happens that the organ is badly damaged in this way without exhibiting externally any appearance of injury, as occurred in the case just related. Furthermore, this patient suffered from concussion as well as from contusion of the spinal cord. He consequently exhibited *reflex motor paralysis*, as well as total loss of sensation and voluntary motion in all those parts of his body which were supplied by spinal nerves that issued from the cord below the injured spot. The extravasation of blood into the gray substance of the cord suppressed its functions as a conductor of impressions to and from the sensorium commune, while the concussion of the cord suppressed its functions as a series of independent nervous centres

arranged one above another, and in this way produced reflex motor paralysis of wide extent.

But the brain and the spinal cord are sometimes, perhaps not unfrequently, affected simultaneously by concussion, as, for example, they were in the following instance, which was reported by Mr. Savory. In such cases the nature of the vulnerating force is always such that the brain as well as the spinal cord, *i. e.*, the whole cerebro-spinal axis, is subjected to its operation at the same moment.

Mr. Savory narrates (*St. Bartholomew's Hospital Reports*, vol. v. p. 459) the case of a man who was injured by falling on his head from a railway van. For some minutes he was stunned, but this soon passed off. When admitted into the hospital there was found to be complete loss of motion and sensation in all of his extremities, both lower and upper, and in his trunk nearly as high as the clavicles. His respiration was entirely diaphragmatic, and the walls of his chest sank inward at each inspiratory effort. No reflex action could be excited in the lower extremities, nor elsewhere. His pupils were moderately and equally dilated, but sluggish; partial priapism was present. In about thirty hours he died.

Autopsy.—No fracture nor displacement of any part of the skull or spinal column was found, and there was no extravasation of blood nor material congestion exhibited on the surface of the brain or that of the spinal cord at any part thereof. But a longitudinal section of the cord disclosed, opposite the fourth cervical vertebra, a clot of blood, which was extravasated throughout its substance, to the extent of about half an inch. The limits of this extravasation were well defined. Nothing wrong could be detected in the adjacent nor in any other part of the cord. (*New Sydenham Soc. Retrospect*, 1869-70, p. 248.)

Well-marked concussion of the brain was produced in this man's case by falling on the head; but the symptoms arising therefrom soon passed away. In about thirty hours, however, death resulted from another cause; and the autopsy showed that no cerebral hemorrhage, nor cerebral congestion, nor any other abnormality of the brain which could be discerned was present. No doubt, therefore, exists that concussion of the brain, *per se*, is not attended with the occurrence of any structural lesion which is recognizable by the anatomist after death, at the present time.

Well-marked concussion of the spinal cord was likewise produced by the fall in this man's case; but the symptoms arising therefrom did not pass away. There persistently remained complete motor and sensory paralysis of nearly the whole body excepting the head and neck, *i. e.*, of all those parts which are supplied with nerves that issue from the spinal cord below a point opposite the fourth cervical vertebra. Not only that, but there likewise remained almost complete absence of any *reflex* action; even the pupils were dilated and sluggish. In fact, the functions of the spinal cord were so strongly invaded by the injuries which it had sus-

tained that death ensued through the lungs, *i. e.*, by suffocation resulting from suspension of the respiratory movements, in about thirty hours, as already stated. At the autopsy, blood in considerably quantity was found extravasated in the interior of the spinal cord, *i. e.*, in its gray matter, at a point opposite the fourth cervical vertebra. Here, there is presented to us a case in which the two chief functions of the spinal cord, namely, that of conducting impressions to and from the brain on the one hand, and those peculiar offices which pertain to the cord as a series of independent, although correlated nervous centres, on the other, were simultaneously interrupted; for there was not only complete loss of sensation and voluntary motion, but nearly complete loss of reflex nervous action also. It is clear that while the loss of the conducting function of the cord can be satisfactorily accounted for by the visible effects of the injury, *i. e.*, the extravasation of blood, which was found in the rachidian substance at the autopsy, opposite the fourth cervical vertebra, the loss of its reflex functions cannot be accounted for in this manner. The suppression or impairment of the qualities of the spinal cord, as a series of nervous centres arranged one above another, must have been due to the concussion to which the rachidian substance in general was subjected by the fall; which, however, produced no effect upon the rachidian substance which was visible after death. No doubt, therefore, exists that concussion of the spinal cord, *per se*, is not attended with any change in structure or appearance which is at present recognizable by the anatomist after death, and that the rachidian and cerebral substance are alike free from any effects of concussions that are visible on examination post mortem.

But *contusion* of the spinal cord, at a point opposite the fourth cervical vertebra, appears to have been produced by the form of injury which this man sustained, as well as cerebro-spinal concussion of a general character; for the gray substance of the cord was found infiltrated with clotted blood at that point to the extent of about half an inch, in such a manner as to present morbid appearances closely resembling those which have been observed in undoubted examples of rachidian contusion. Moreover, it is by no means improbable that this man's fall was attended with a violent flexure of his neck, at its middle part, of an abrupt or angular character, and with a correspondingly short bending of the spinal cord at the same point, which, together with the sudden shock or commotion of the rachidian substance that resulted from the fall itself, burst open some capillaries within the bent part of the cord, and caused the sanguinolent infiltration of the rachidian substance above described. Thus, we find that in this instance concussion of the brain and spinal cord was complicated with contusion of the latter, and that death occurred in considerably less than one and a half days.

Contusions of the spinal cord not unfrequently occur. They are often met with in cases of vertebral fracture, and in cases of vertebral disloca-

tion. In such cases it very often happens that the spinal dura mater (theea) is not torn; and, not unfrequently, on laying it open, and finding the spinal pia mater entire and without ecchymosis, as well as the exterior of the cord free from any morbid appearance whatever, one might imagine the cord itself to be quite uninjured, while, at the same time, the gray substance of its interior is extensively disorganized and infiltrated with dark-coloured blood, in consequence of the bruising to which the cord has been subjected. Obviously these striking lesions are exposed to view only by incising the cord through and through. Mr. Hutchinson, in a clinical lecture (*London Hospital Reports*, vol. iii.), has mentioned a case in which the cord-substance was reddened internally by extravasated blood, and likewise broken into a diffident pulp for nearly an inch and a half. He also exhibited a drawing of the same; yet, in this instance, the pia mater was entire, and without ecchymosis.

But something should now be said concerning the *prognosis* and *treatment* of concussions complicated with contusions of the spinal cord. In such examples of these injuries as those presented above, examples wherein the rachidian concussion is very severe and the contusion (which is also severe) wounds the cervical part or the beginning of the dorsal part of the cord, the prognosis is always very bad; for the patient is exceedingly liable to perish before reparation of the bruised cord-substance can be effected, in consequence of suffocation slowly produced by stagnation of venous blood in the lungs, due to the respiratory movements—the act of breathing—being not properly nor adequately performed, which necessarily ensues when the conducting functions of the cord are suppressed in the cervical region, and all the respiratory muscles are paralyzed excepting the diaphragm. When, however, the contusion is seated in any portion of the spinal cord whereof the constituent filaments and nerve-cells do not exert any control over the movements of the muscles employed in the act of breathing, for instance, in the middle and lower part of the dorsal, as well as in the lumbar region, reparation and recovery may doubtless be effected; and the prognosis in such instances is therefore much less unfavourable. At any rate, it is scarcely more unreasonable to expect to obtain the cure of such cases by treating them judiciously, than it is to expect to obtain the cure of so-called cases of *infantile spinal paralysis*, wherein the rachidian lesion consists of disorganization of the gray matter in the anterior cornua, and is therefore closely analogous to the rachidian lesion which exists in those instances of contusion of the cord-substance where the bruising and the ecchymosis are restricted to the gray matter thereof, which instances probably constitute a large majority of the injuries in question. Moreover, it is now well known that cases of infantile spinal paralysis are not unfrequently cured without much difficulty by appropriate treatment.

In conducting the *treatment* of contusion of the spinal cord-substance,

the indications to be fulfilled are: (1) to promote absorption of the extravasated blood; (2) to lessen the rachidian hyperæmia, both arterial and venous, which is always liable to supervene in such cases; and (3) to prevent the development of myelitis, especially the suppurative and diffuse or ascending forms thereof, as well as the development of spinal meningitis. A remedial measure of transeendent importance in such cases is quietude or rest of the injured part, as nearly absolute as possible. If the rachidian contusion be caused by luxation of the vertebræ, or by fracture with displacement of these bones, the displaced vertebræ should always be restored to the normal position, *i. e.*, reduced, at the outset, either by means of the patient's posture in bed, which sometimes suffices, or by means of extension, counter-extension, and coaptation applied with the help of competent assistants, in order that the wounded parts may be restored to those surgical relationships which are most favourable to recovery. Indeed, the statistics collected by Professor John Ashhurst, Jr. (*Injuries of the Spine, with an analysis of nearly four hundred cases*, p. 66), very clearly show "that the proportion of deaths has been almost three times larger when general treatment has been exclusively used than when extension (combined, of course, with rotation and pressure as required) has been employed." Should the vertebral displacement exhibit a tendency to return, it must be overcome either by posturing (sometimes the placing of the patient in a prone position in bed will do it), or by making continuous extension and counter-extension by means of weights suspended at each end of the bed with cords passing upward over pulleys and attached to broad strips of adhesive plaster, which are fastened to the patient above as well as below the seat of vertebral injury. Not unfrequently, however, the counter-extension can be successfully made by simply elevating the foot of the patient's bed upon blocks of wood placed underneath the legs thereof for that purpose. In such a case, the extension would be made by a weight of twelve or fourteen pounds suspended at the foot of the bed, in the manner indicated above.

When continuous extension by means of weights is unnecessary, the prone position is generally preferable to the supine, unless it greatly discomforts the patient; for it readily permits the application to the back of leeches or cups, of ice-bag or ice-poultices, and of blisters or the hot iron, whenever needed. At the same time, the back being the highest instead of the lowest part of the body, the tendency to hypostatic congestion of the rachidian veins is much diminished by the prone posture of the patient, and the tendency to myelitis and spinal meningitis is also correspondingly lessened thereby.

The absorption of extravasated blood and serum may be considerably promoted by administering (*per orem*) potassium iodide in doses of ten grains three times a day. Rachidian congestion, venous as well as arterial, can be considerably lessened by administering in the same way the fluid

extract of ergot in full doses. Strychnia should never be prescribed for such patients, for it always harms them. Should, however, myelitis or spinal meningitis unhappily supervene, it must be combated, at the outset, by leeching or cupping the back over the seat of injury, followed by cold applications; later, by blisters or hot iron, the latter generally proving more useful. Internally, potassium iodide and ergot should be given in large doses, as well as saline purgatives, and opium with sufficient freedom to subdue all pain. Should the patient be unable to micturate at will, catheterization must be performed at least twice a day. The diet must be nourishing and easily digestible. Cleanliness of the genitalia and buttocks must be continuously enforced, and great pains taken to prevent the development of bed-sores.

Brief mention should also be made of the less severe instances of concussion complicated with contusion of the spinal cord. For example: A man falls with considerable violence, his back striking upon the hard ground. He immediately perceives a peculiar sensation of "pins and needles" in his hands, feet, and legs, especially in the last two. He gets up; but, having done so, he finds that the motor power and sensibility of his lower extremities are considerably lessened. Nevertheless, he manages to ride home, and at once goes to bed, hoping that he will be better on the morrow. But, after passing a restless night, he finds in the morning that the numbness and weakness of his lower limbs have not diminished; furthermore, he is unable to get up because, as he says, he is in pain all over; he feels sore and stiff just as he would if he had been bruised all over, so that it is painful for him to attempt to stir his limbs, or to try to make any movement whatever. He also finds himself unable to urinate.

What has happened to this man? He has not caught cold; nor has he rheumatism; nor has he been strained nor bruised externally. He has received no strain nor bruise in the parts where the pain and soreness are perceived. This state of general hyperæsthesia which he experiences, together with the diminution of motor power and sensibility in the lower extremities, as well as the inability to urinate, all result from a structural disturbance which the spinal cord sustained in consequence of the blow on the back; in other words, there occurred in this case concussion complicated with slight contusion of the rachidian substance, which were followed by active hyperæmia of the same. The *treatment* should consist in the application of numerous dry cups to the back on each side of the spinous process, with extract. belladonnæ, gr. $\frac{1}{4}$, administered four times a day, catheterization twice daily, and rest in bed. Under this plan of treatment complete recovery will soon be obtained.

But should the patient discard the advice in respect to remaining quietly at rest in bed until the spinal symptoms have entirely passed away, he will be very liable to acquire for himself suppurative myelitis and incurable

paraplegia, as happened in the case mentioned by Mr. Hilton (*Rest and Pain*, p. 33), of a man who had a fall upon his back at Epsom, from the giving way of a scaffold. He immediately experienced the sensation of "pins and needles" in his legs. Being a most energetic man, he arose and ran six miles. He had been told, when a boy, that if he ever had an accident of this kind he should run off its effects as soon as possible. In a very short time, however, unequivocal spinal-marrow symptoms ensued, which resulted in complete and irremediable paraplegia.

Finally, it should be stated in regard to *contusions of the brain* that their symptoms have been described with sufficient copiousness in connection with the various examples which have been presented above; also, that the principal indications for their treatment are, (1) to prevent consecutive encephalitis, (2) to control such inflammation by remedial measures of sufficient energy should it unhappily supervene, and (3) to draw off the products of such inflammation (*e.g.*, purulent matter, etc.) by trephining the skull, and puncturing the cerebral membranous and cerebral substance whenever they cause paralysis on the opposite side of the body by compressing the cerebral substance, whether coma be likewise present or not, for a cerebral abscess never spontaneously gets well.

17 CLINTON PLACE, April, 1883.

ARTICLE III.

A DEMONSTRATION OF THE FEEBLE INFLUENCE OF IODINE OVER MALARIAL FEVERS, BASED UPON AN ANALYSIS OF 76 CASES OF INTERMITTENT AND REMITTENT FEVERS TREATED WITH THE AGENT. By I. E. ATKINSON, M.D., Prof. of Pathology in University of Maryland, and HIRAM WOODS, M.D., House Physician of Bay View Asylum, Baltimore.

THERE have recently appeared numerous reports from medical men in various parts of the world, reciting the virtues of iodine in the treatment of malarial fevers. It is true that these do not all agree as to the exact degree of reliance that may be placed in this agent as an antiperiodic. There are, however, those who claim for it an efficacy not less than that of the preparations of Peruvian bark, as far as the immediate control of the attack is concerned; even greater than that of these agents in preventing its recurrence. Such was the experience of Dr. Grinnell, who treated 140 cases of malarial fever at the Wichita agency, Indian Territory (*Braithwaite's Retrospect*, vol. 83), as well as that of Dr. W. M. Anderson (*Proceedings of Med. Soc. of Kings County*, 1879-80), who treated at the South Brooklyn Dispensary, over 200 cases, of whom "a large percentage returned . . . enough to show, with private patients,

that the results were not merely *post* but *propter hoc*." Dr. R. B. Morison reports highly gratifying results from the administration of 15-minim doses of tincture of iodine, in 250 malarial cases treated during 1881. Of the whole number, 150 were not heard from after the first visit, but of the 100 who returned once, twice, or oftener, 84 were on record as cured, 2 as not cured, and 12 as not cured either with iodine or cinchonidia. Dr. Morison was so favourably impressed with the action of iodine in the treatment of acute malarial diseases, that it was employed to the exclusion of other remedies in his service in the out-patient department of the University of Maryland, where his cases were treated (*Maryland Med. Journ.*, vol. 8, No. 20, p. 461).

Similar experience appears to have been acquired by Sirear (*Indian Med. Gaz.*), Gibbons (*Pacific Med. and Surg. Journal*, Sept. 1880), Bell (*Med. and Surg. Reporter*, Phila. 1881, xlv.) (in chronic malarial poisoning), Geoghan (*Albany Medical Annals*, 1880, iii.), who successfully treated 41 out of 43 cases of intermittent fever, Kemper (*Amer. Practitioner*, xviii. 1878), Wadsworth (*N. Y. Med. Journ.*, 1879, p. 493), and others. Willibrand (Virchow's *Archiv*, xlvii. p. 243) declares that in iodine we possess a specific remedy for malarial diseases equal to cinchona. Stillé and Maisch extol the anti-malarial virtues of iodine, and Bartholow (in the 4th edition of his *Mat. Med.*, 1882, p. 222-223), pronounces in its favour, relying, however, it would seem, more upon the testimony of others than upon his own experience.

It must be confessed, however, that the results of the writers quoted do not entirely agree. Here we find an assertion that it is in chronic malarial poisoning that iodine does its work most effectually; there, that its value in this variety is nothing; in another article we find that the drug is recommended to render permanent the cure that quinine has begun; in still another, that it is given in combination with quinine, arsenic, etc. On the other hand, we find that anti-periodic properties are denied to iodine by some. Thus, Fridenburg (Mt. Sinai Hospital Reports, *N. Y. Med. Journ.*, 1880, xxxi. p. 50) obtained no good results from its use; and Bannerjee in the *Calcutta Med. Gaz.*, Jan. 1882, relates a very interesting experience with iodine in the treatment of malarial complaints. In 1878, Bannerjee tried it in 7 cases with but a single successful result. In 1879, he used iodine in 500 cases with very satisfactory results (90 per cent. of cures). In 1880, he used it again in nearly 160 cases, but without as great success. He now recognized that many of these fevers were of an ephemeral character, and tended to limit themselves, and arrived at the conclusion that about 20 per cent. of cases are cured spontaneously either on the 3d, 4th, or 5th day, or sometimes even on the 7th or 8th day. He concludes that iodine is much inferior in the treatment of these maladies to quinine.

Attracted by the testimony in its favour, and with the desire to defi-

nately ascertain the powers of iodine as an anti-malarial remedy, in view of the ease of its administration, and of its comparatively small commercial value, we availed ourselves of the opportunity of treating malarial fevers, afforded at Bayview Asylum, Baltimore, during the late summer and autumn of the past year (1882). We were the more impelled to test the merits of the remedy, upon the one hand, on account of the very unsatisfactory character of the evidence in its support, relating either to dispensary practice or to general results, and, upon the other hand, because of the exceptionally favourable opportunities at our command of observing a large number of cases of malarial fever throughout their course, and of closely studying the effects of treatment. Our cases came under observation during July, August, September, and October, and were largely composed of foreign labourers who had contracted their fevers while employed in fruit and vegetable canning establishments in highly malarious sections of the neighbouring country. They number 76 cases of intermittent and remittent fevers, and their appended histories, with the carefully recorded reports of the effects of treatment, clearly demonstrate the very feeble influence of iodine over malarial diseases; at least over the acute forms, for with the treatment of chronic malarial poisoning with iodine we have had but limited experience.

As stated, we treated in all 76 cases of malarial fever with the tincture of iodine. The doses given varied with the demands of each case. Usually, the dose was thirty drops (15m) of the official tincture of iodine four times daily. Our plan was to give the iodine in this dose steadily for five days, and if, at the end of that period, a cure had not been effected, to substitute the sulphate of einchonidia. We have preferred to classify and analyze our cases, rather than to report the full history of each case as recorded, in order to avoid a tiresome and uninteresting lengthening of our article.

Of our 76 cases, we record only 16 as cured by iodine. An analysis of these 16 cases, however, will show that recovery can by no means in all of them, with certainty, be ascribed to the remedy. For, apart from the well-known tendency of sufferers from chronic malarial poisoning to develop irregular paroxysms of ague, it is a matter of some doubt whether one or two of them had malarial fever at all. It is evident that uncertainty may well exist where one paroxysm of fever is *reported* to have occurred, while there will be but little difficulty in definitely determining the nature of cases whose symptoms afford repeated opportunities for recognition. The cases referred to belong to the early period of our observations, and, though lacking the definiteness so desirable in scientific research, we have concluded to report them for what they are worth. In five only of our sixteen "cures" was the attack stopped at once. These were Cases III., IX., XV., XLIV., and L. of our records. Case III. reported irregular attacks of ague for more than two years.

She had also chronic Bright's disease. Case IX. had chronic malarial poisoning, and claimed to have had "dumb ague" for two weeks. One of the house physicians observed her with a single high temperature. She was given twenty-five drops of tincture of iodine thrice daily for several days, and had no return of the paroxysms. Case XV. gave a history of two tertian chills. Twenty-five drops of the tincture were given thrice daily. By the time of the next expected chill he had taken three doses of the remedy. These were not sufficient to prevent it. His temperature reached 102° F., but after this he had no more fever. Case XLIV. was a half-starved individual who had been treated two weeks previously for tertian fever with quinine. After admission he had one attack, with a temperature of 100° , at the regular time. Thirty drops of the tincture were given thrice daily, and he had no return of the ague. Case L. had a single chill after admission, and was given the iodine immediately. He had no subsequent paroxysm. It will be observed that of these, Cases III. and IX. were subjects of chronic malarial intoxication, and that the single chill observed in each may have been one of its manifestations.

Four more of these sixteen cures occurred after from two to three days' treatment. They were Cases II., VII., XXXI., and XLVIII. An element of doubt also accompanies them. One (Case II.), a woman, asked admission to the hospital ward on account of a chill which she claimed to have had. This was denied her, and she was ordered to take fifteen drops of the tincture of iodine thrice daily. She reported one more tertian chill. She was seen within two hours of each of these reported attacks, but had no fever either time. Case VII. had well-marked chills on the first and third days of observation. He was given thirty drops of the tincture thrice daily, and remained free from fever after the second attack. Case XXXI. gave a history of double tertian ague of four weeks' duration. He was given thirty drops of the tincture thrice daily. He reported a chill during each of the first two afternoons of his stay in the hospital, but was contradicted by the ward master. His temperature, taken four hours after each asserted chill, was 100.6° and 98.4° . Case XLVIII. took the tincture in doses of thirty drops four times daily for three days, when it had to be stopped on account of the nausea it occasioned, even in reduced doses. He had a chill during the evening before treatment was begun, with a temperature of 102.8° , and chills on the second and third days, with temperatures of 104° and 103.4° . Although the medicine was now stopped on account of the nausea, he had no more ague during the period he remained with us.

We have hesitated to report Cases II., III., IX., and XXXI. of these nine "cures," but give them, desirous of yielding to the "iodine treatment of malarial fever" all the credit it can possibly deserve. Cases I., IV., XXXV., and LVIII. were cured after a treatment lasting more than three days. Case I. had a chill daily for six days, with temperature

varying from 103° to 105.2° . During five days he took twenty-five drops, afterwards thirty drops of the tincture thrice daily. On the seventh and eighth days he had evening temperatures of 100.6° , but no chill. After this his temperature remained normal. Case IV. had, for six successive days, a chill in the morning of one day and in the afternoon of the next (double tertian), with temperatures varying from 102° to 103° . On the seventh day he missed his chill, but had one on the evening of the eighth day. This was his last. He took at first fifteen drops thrice daily. The dose was gradually increased to twenty, twenty-five, and thirty drops thrice daily. Case XXXV. took forty drops four times daily, and had a chill on each day for four days, with temperatures of 102.2° , 104° , 102° , 102° , after which it became normal. Case LVIII. took twenty drops of the tincture thrice daily. He had chills on the second and fourth days, with temperatures of 105° and 102° . On the sixth day he had a temperature of 100° , but no chill, and became convalescent.

The remaining three cures were of remittent fevers. In two of these iodine seems to have had an immediate influence, the temperature falling to normal soon after beginning treatment, remaining so, however, but a short time. The exacerbations soon recommenced, and the final reduction to normal condition in all three cases was accomplished by a *gradual reduction of the violence of the exacerbations and of the height of the temperature*. Case XXI. took thirty drops four times daily. After two doses his temperature fell from 102.4 to 99.4° on the morning of the second day. That evening it rose again to 100° ; next evening to 102.7° ; on the fourth evening it was 102° ; on the morning of the fifth day it was 101.2° . It then fell to normal and remained so for six days, when the patient was discharged. This man had had malarial intoxication for three months. It is, therefore, not impossible that the attack was a manifestation of chronic malaria with spontaneous subsidence. We credit the tincture of iodine with the cure, however. Case LXI. took twenty drops of the tincture thrice daily. His thermal line was: First day, M., 101° , E., 104° ; second day, M., 98.2 , E., 102.4° . It now became normal, and remained thus for two days, when it again reached 101° , and came down gradually as follows, viz.: 101° , 99.4° , 99° , normal. The remedy was taken throughout. Case XXVIII. took thirty drops four times daily. His morning temperature was always from 1° or 2° below that of the evening. It became normal on the sixth day. As shown by the following thermal line, the evening temperature fell to normal on the eighth day: 103.6° , 103.3° , 103° , 102.1° , 101.8° , 100° , 100° , 99.2° . This case shows clearly the *gradual* reduction of which mention has been made, and which will be further observed when relapses of remittent fever are considered.

Thirteen cases, eight intermittent and five remittent fevers, seemed at first to be benefited by the iodine, but the improvement was not perma-

nent. Of the intermittents, six were quotidian and two tertian. Of the quotidian fevers, Case XVIII. took twenty drops of the tincture four times daily. The chills ceased after three days and recurred after five days, the patient taking the remedy all the while. On the fifth day at the usual chill time, the temperature was 101° , and at the same time next day it was 103° . This case resisted all remedies, including cinchonidia and quinia, for, after we ceased to give the iodine, we gave these agents, checking the paroxysms at once, but subsequently a relapse occurred. Case XLI. took thirty drops of the iodine four times daily and had three chills, with temperatures of 106° , 104° , 102.8° . For six days after this last chill he continued to take iodine. He was then discharged. He was readmitted on the fourteenth day after his last paroxysm, with a return of his chills. He was again given iodine in twenty drop doses of the tincture thrice daily. He had two paroxysms, but no more while under observation. Case XLV. had two chills, with temperature of 104° , while taking the tincture of iodine in thirty drop doses four times daily. The attack did not recur on the third day, but he had chills on the fourth and fifth days, with temperatures of 104° and 104.8° . The sulphate of cinchonidia was now given, whereupon the paroxysms ceased, and did not return. Case XLVI. took thirty drops four times daily. He had one chill, with a temperature of 104° . He remained without attack until the fifth and sixth days, when he had chills with temperatures of 104.6° and 101.8° . On the sixth day he was given cinchonidia. He had a chill on the seventh day, and no more during the week he remained under observation. Case XLIX. had two quotidian chills while taking twenty drops thrice daily. He continued to take iodine for four days. Nine days after the last paroxysm he had another attack. Under the use of cinchonidia he had no further trouble. Case LII. had three daily chills, and took thirty drops of the tincture four times daily. He escaped a chill upon the fourth day, but had one on the fifth day, with a temperature of 104.2° . He also had one on the sixth day. Iodine was now discontinued and sulphate of cinchonidia given. After this there was no further trouble. Of the two relapses of tertian intermittents, Case XVI. took thirty, twenty, fifteen, and ten drops of the tincture thrice daily, the dose being gradually reduced on account of nausea. He had one paroxysm, with a temperature of 100.2° , after beginning to take the iodine. On the seventh day (after nausea had compelled us to discontinue the medicine), and nearly eleven days after the last paroxysm, he had a chill with a temperature of 101° . Cinchonidia was now given. He had a chill upon the first day, but no more for the three months during which he remained in the institution. Case LIII. showed rather a postponement of the attack than a relapse. He had chills on the second, fourth, sixth, and eighth days, while taking thirty drops of iodine four times daily. He had no chill

upon the tenth day, but the chills recurred upon the eleventh and thirteenth days, when cinchonidia was substituted with prompt results.

Each one of the five cases of remittent fever was taking iodine at the time of the relapse. As may be seen by the thermal records that follow, the violence of the exacerbations was becoming daily less, and the temperature was gradually falling towards normal. The relapse was shown by a sudden rise of temperature. Case XXIII. took the tincture for five days, during which his evening temperature ranged from 99° to 100° . His morning temperatures were as follows: viz., 102° , 101.4° , 101° , 100.4° , 99° . Upon the sixth day, the morning temperature was 100.6° , the evening temperature 102° . Cinchonidia was now given. He had one more paroxysm with a temperature of 100.6° , and that was all. Case XXXIX. had a temperature of 100° , and gave a clear history of previous malarial disease. Thirty drops of the tincture were given four times daily, and the temperature fell to normal limits within four days. For the next three days it was as follows, viz.:—

5th day, A. M.,	100° ;	P. M.,	100°
6th “ “	100.2 ;	“	102
7th “ “	100.7 ;	“	102.3

Cinchonidia was substituted, and the temperature became normal at once, and remained so during the week the patient continued under observation. Case XLIII. is best represented by the thermal line:—

1st day,	P. M.,	104.8°.	
2d	"	A. M., 102°; P. M.,	104.4°
3d	"	"	102; " 103.6
4th	"	"	101; " 102
5th	"	"	99.4; " 101
6th	"	"	100; " 102.6
7th	"	"	98.6; " 103
8th	"	"	100

Cinchonidia was ordered, and during the four days he remained in the hospital he had no more fever. Upon a single occasion during the treatment the patient's urine contained albumen. Case XLVII. took thirty drops of the tincture four times daily. For four days there was no improvement, the morning temperature varying between 100° and 100.6° ; the evening temperature between 102° and 103.4° . During the next two days there was a gradual fall, as follows, viz.: During the evening of the fourth day, 102.8° . Fifth day, A. M., 102° ; P. M., 100° . Sixth day, A. M., 99.8° ; P. M., 101.2° . During the next three days the fever continued with morning temperature from 99° to 100° , and evening temperature from 100.6° to 101.2° . On the morning of the ninth day the temperature was 98.4° , but during the evening it reached 103° .

Sulphate of cinchonidia was now given; the fever ceased at once, and did not recur during the two months he remained in the institution. Case LI. had had malarial intoxication a long while. He took thirty drops of the tincture of iodine four times daily. The subjoined table shows the gradual reduction of the temperature:—

1st day, A. M.,	102°	; P. M.,	103°
2d “ “	99.4	; “	103
3d “ “	101	“	102
4th “ “	99.4	; “	101
5th “ “	98.4	; “	100

The temperature varied between 98–100° for four days, after which it increased for three successive evenings, as follows: 101°, 100.4°, 101°. Sulphate of cinchonidia was substituted for two days, without affecting the temperature, which on the eleventh day was 102° in the morning, and 102.8° at night. Sulphate of quinia was then given. The temperature became normal within forty-eight hours, and remained thus during the succeeding eight days of his stay in the hospital. This patient had splenic and hepatic engorgement. Each region was exceedingly tender on pressure. This tenderness the local application of the tincture seemed to benefit. In all these cases there was complaint of nausea, though vomiting was not produced. The addition of ten drops of laudanum to each dose secured toleration for the iodine in nearly all cases, and enabled us to continue its administration during the five days of trial.

Four cases, however, suffered so much nausea and vomiting that we were forced to discontinue the administration of iodine, while the physical prostration of a fifth patient impelled us to abandon its use before the period of trial was completed. Case X. had two tertian chills, for which he took twenty-five drops thrice daily. Upon the fifth day he suffered intense nausea, vomiting the iodine as soon as taken, even in fifteen-drop doses. He had a third chill upon the seventh day. Case XIII. commenced treatment by taking twenty drops thrice daily. Nausea set in, and doses of only ten drops were rejected. Troublesome diarrhoea also appeared, but yielded to opium. He had chills upon three successive days while taking iodine. Case XX. was first given thirty drops four times daily. After the first day he was unable to retain the drug, though reduced to fifteen-drop doses. After a day's rest the iodine was resumed in ten-drop doses with tincture of opium, but was always rejected. While taking the tincture he had four daily chills, with temperatures of 102°, 101°, 101.7°, 102.7°. For several days he vomited everything. Sulphate of cinchonidia was given as soon as it could be retained. During the following three days his temperature remained about 101°, and he developed puffiness of his eyelids, swelling of the abdomen, and albuminuria. The last symptom disappeared after four days, and convalescence was established

without delay. Case XXXIII. took for three days thirty drops of the tincture four times daily. At the end of this period he became so prostrated that we were compelled to stop it. During its administration he had a chill each day with temperatures of 102.4° , 104.5° , 102° . Cinchonidia was substituted. He had a chill the next day, but no more. One more case must have especial mention. This patient, a young man, took thirty drops of the tincture of iodine four times daily. He had chills on the second and fourth days, but none on the sixth day, though he suffered greatly from nausea and vomiting. The dose was reduced to ten drops with laudanum, but he became quite unable to retain it. Swelling of the ankles and abdomen developed. An examination of the urine gave sp. gr. 1.008; intense iodine reaction, although the last dose had been given three days previously; *no albuminuria*. Two days later there were marked ascites, with general anasarca and pronounced albuminuria. The microscope revealed hyaline and finely granular tube-casts in large numbers. The symptoms of acute tubular nephritis developed. Albuminuria was present during eleven consecutive days, and was absent during the following six days. It was again present in minute quantities for two or three days, after which several examinations made during the following two months failed to discover it.

Four cases left the hospital before we had completed the trial of iodine. Case IV. took thirty drops four times daily, and had a chill each day for three days. He then left without permission. Case VIII. took thirty drops three times daily. He had three tertian chills, when he demanded his discharge and left. These cases should be classed with the failures. Case XXIX. had normal morning temperatures, and evening temperatures of $100-103^{\circ}$. By gradual reduction, while still taking iodine, this reached normal limits by the fourth day. He left the hospital the following day, and we were unable to determine the permanence of the cure. Case XLII. had normal morning temperatures, but his evening temperatures for five days were: 102.4° , 100° , 100° , 102.8° , 99° . This last was taken at four o'clock P. M., and indicated a rise of 1° in six hours. He took thirty drops four times daily. He left the hospital without warning.

We have now considered 39 of our 76 cases, and have certainly allowed to iodine all its most enthusiastic supporters could demand. We have given so much space to the "cures" and "relapses," because we wished to show in what manner iodine exercises the feeble influence it seems to exert as an antiperiodic. These 39 cases, it seems to us, fully demonstrate the feeble antiperiodic powers of iodine. The very work it accomplishes condemns it. In the 37 cases which follow we were unable to see the slightest benefit from its use. These cases compose 20 quotidiens, 7 tertians, 3 double tertians (a paroxysm on *each* day, but corresponding in *time* and *severity* on *alternate* days), 2 triple tertians (two paroxysms

on alternate days, and one on other alternate days), and 5 cases of remittent fevers.

Of the quotidian fevers: Case XI. took twenty-five drops for nine days. His evening temperature varied from 102° to 105° ; morning temperature from 98° to 99° . Cinchonidia was substituted, and the chills ceased at once. Case XII. took twenty-five drops thrice daily. He had daily chills for five days, with temperature from 102° to 103° . After this he had evening temperature of 101° to 102° for four days without chills. Cinchonidia effected an immediate cure. Case XVII. took thirty drops four times daily, for five days. He had a chill each day, with temperatures from 102° to 105° . He was cured at once by cinchonidia. Case XXV. gave the same history as the preceding case. He was given thirty drops four times daily for five days, and had a chill each day, with temperature from 102° to 106° . He also was completely cured by cinchonidia, and at once. Case XXVII. took the same doses as the preceding patient. He had five daily chills, with temperature of 102° to 103° . Cinchonidia was then given with prompt relief. These 6 cases are typical of 13 more of the 20 cases of quotidian fever. Of these 13 cases, XXVI., XXXIV., XLIX., and LVI. took thirty drops four times daily for five days. In XLIX. it produced great nausea on the fourth day. The 9 other cases, LX., LXIII., LXIV., LXVI., LXX., LXXI., LXXIII., LXXV., LXXVI., took twenty drops thrice daily. These latter cases were treated after several cases of albuminuria had been observed, and we reduced the dose in consequence. All of them were able to take the iodine for five days, although some were fortified against its unpleasant effects by laudanum or carbolic acid. In each case there was a chill each day, the temperatures ranging from 101° to 106.5° . Cinchonidia checked every one of them. Case LVII. was the last of this series. Treatment was begun by the administration of thirty drops four times daily. This dose nauseated on the third day, and was reduced to twenty-five drops, with ten drops of laudanum to each dose. This he took with difficulty until the fifth day. He had daily chills in the afternoon, with temperatures of 104° , 104.6° , 101° , 103° , 102° . Cinchonidia promptly arrested the paroxysms, and he had no chill during the subsequent eighteen days, during which he remained under observation. The day after we discontinued the iodine his urine showed traces of albumen. This disappeared two days later, and did not return.

Of the cases of tertian ague not benefited by iodine, Case V. took fifteen drops thrice daily. This was increased to twenty-five drops on the third day, and to thirty drops, four times daily, on the fourth day. This was one of our first cases, and we administered the drug for thirteen days. For nine days the fever was tertian; during the last four days he had a chill each morning. The disease yielded at once to cinchonidia, and did not return. Case VI. was also one of our early ones, and we gave

the tincture for ten days. As in the preceding case, the patient grew worse instead of better. After the first chill he took fifteen drops three times daily, and after his second chill twenty drops four times daily. On the fifth day, after a chill and high fever, the dose was increased to thirty drops four times daily. He had chills upon the sixth and eighth days, and upon the latter date, the dose was made thirty-five drops four times daily. He had a chill upon the *next* day, and the iodine was discontinued. Cinchonidia cured him at once. Case XXXII. took thirty drops of the tincture four times daily. He had on the first, third, fifth, and seventh days chills, with temperatures of 104.8° , 105.8° , 102.4° (seventh day not taken). Cinchonidia was substituted after the last chill, and he had no more. Case XXXVII. had chills on the first, third, fifth, and seventh days, with temperatures of 101° to 104° . The dose of the tincture at first was thirty drops four times daily. Diarrhœa appeared upon the fourth day, and nausea on the fifth, when the dose was reduced to twenty-five drops, with ten drops of laudanum. Abdominal pains were complained of. Cinchonidia stopped his chills at once, but there was a relapse later. Case XLVIII. took twenty drops three daily. He vomited this dose on the second day, but the addition of tincture of opium enabled him to retain it with difficulty. On the first, third, fifth, and seventh days he had chills, with temperatures from 102° to 103.6° . Cinchonidia stopped them at once. Case XXXVIII. took thirty drops, four times daily, for six days, and had chills on the second, fourth, and fifth days, with temperatures of 100° to 101° . These ceased as soon as cinchonidia was given. Case LXXII. took twenty drops three daily. He had chills on the mornings of the first, third, and fifth days, with temperatures of 103.8° , 103.2° , 103.5° . Cinchonidia was given with immediate relief.

Of the double tertians, Case XIX. took thirty drops of the tincture four times daily. On the first, third, and fifth days he had chills during the afternoon, with temperatures of 101.4° , 103.2° , 105.2° . On the second, fourth, and eighth days his chills began about 7 o'clock A. M., with temperatures of 105° , 102.6° , 103° . All evidence of the malady disappeared upon the administration of cinchonidia. Case XXIV. was, strictly speaking, more properly a "duplicated tertian" than a "double" tertian, as the two paroxysms occurred on the *same days*. This patient took thirty drops four times daily for four days; on the fourth day the dose was reduced to twenty drops, on account of nausea. On the second, fourth, and sixth days he had morning chills with temperatures of 100° , 102° , 102° , and on the afternoons of the same days more violent chills, with temperatures of 106.4° , 106.2° , 104° . After beginning to take cinchonidia he had one chill only, and then had no more trouble. The iodine was discontinued after the fifth day. Case LIX. had, on the evenings of the first, third, and fifth days, temperatures of 100° , 101° , 102° , without chills. On the afternoons of the second, fourth, and eighth

days he had chills, with temperatures of 100° – 102° . Cinchonidia was given, and he had no more chills.

Of the triple tertians, Case LXV. took twenty drops three times daily. On the first, third, and fifth evenings he had temperatures of 101° , 100.8° , 100.4° , without chills. On the second, fourth, and sixth days he had morning temperatures of 101° , 100.8° , 102° , and on the afternoons of the same days he had severe chills, with temperatures of 105° , 104.4° , 104.8° . In spite of cinchonidia (now given), he had on the eighth day a morning temperature of 103° , and an evening temperature of 102.8° , but no chill. This was his last attack. Case LXXIV. had a very violent attack, with great prostration. After taking thirty drops of the tincture of iodine thrice daily, he vomited his medicine, but took after this fifteen-drop doses with difficulty. For five days he had a chill each afternoon, with temperatures of 103.4° , 103° , 103° , 101.6° , 103° . On the second and fourth days he had, in addition to his afternoon chills, morning temperatures of 100.2° and 101.6° . He now took cinchonidia, and missed his chill on the seventh day, but it came on the evening of the eighth day with a temperature of 102.5° . This was the last.

Iodine failed to benefit five cases of remittent fever. Case XIV. took at first twenty-five drops of tincture of iodine thrice daily. On the third day the dose was increased to thirty drops four times daily, but was reduced on account of diarrhœa. For five days his morning temperature was 99.4° and less. The evening temperature varied between 101° – 102° . Cinchonidia was given, and the patient at once got well. Case XXII. was the second patient who resisted both cinchonidia and quinine after the failure of iodine. His fever seemed to wear out at the end of three weeks. While taking thirty drops four times daily, the thermal line was: 1st day, A. M., 100° ; P. M., 98° . 2d day, A. M., 98.6° ; P. M., 101 . 3d day, A. M., 102° ; P. M., 101.8° . 4th day, A. M., 99° ; P. M., 104.6° . 5th day, A. M., 99.4° ; P. M., 100.6° . 6th day, A. M., 98.4° ; P. M., 101° . After cinchonidia was substituted, the exacerbations became even greater. Quinine was next given, and the temperature fell only gradually to normal, reaching normal limits not until the end of the third week. Case XXX. began to take thirty drops four times daily. This had to be reduced to twenty drops on account of nausea. The subjoined thermal line shows no evidence of the "gradual reduction" already spoken of, but there seems to have been an intermittent element in the morning temperatures: 1st day, A. M., 100.7° ; P. M., 104° . 2d day, A. M., 98.4° ; P. M., 103° . 3d day, A. M., 101.6° ; P. M., 104° . 4th day, A. M., 99° ; P. M., 104° . 5th day, A. M., 101° ; P. M., 103.4° . 6th day, A. M., 99° ; P. M., 103° . 7th day, A. M., 100.2° ; P. M., 101° . Cinchonidia was substituted for the iodine on the sixth day with prompt relief. Case LV. took thirty drops four times daily. On alternate evenings, for six days, his temperature was 100 – 101° . In spite of cinchonidia, it reached 101° on the eighth day,

but he had no subsequent trouble. Case LXVII. took twenty drops of tincture of iodine thrice daily for six days. His thermal line was: 1st day, A.M., 99.4°; P.M., 103.6°. 2d day, A.M., 102.6°; P.M., 103°. 3d day, A.M., 98°; P.M., 97.8°. 4th day, A.M., 98.4°; P.M., 103°. 5th day, A.M., 97.6°; P.M., 99.7°. 6th day, A.M., 99.7°; P.M., 102.6°. The patient became entirely well immediately after taking cinchonidia.

This concludes the summary of our work. Before drawing our conclusions, we wish to answer an objection which may possibly be brought against our cases. This objection, indeed, has already been made by Dr. Gibbons, in the *Pacific Medical and Surgical Journal*, against Dr. Fridenburg's report adverse to the claims of iodine as an anti-periodic. Substantially it is this: The dose given is too large, produces nausea and vomiting, preventing thus absorption, and so enforcing failure. To this we would reply that of our sixteen "cures" nine were effected while the patients were taking *thirty drops four times daily*, and in two of these the dose was gradually increased from fifteen and twenty drops thrice daily after these latter doses had failed to benefit. The *severe* cases, the cure of which we have credited to iodine, all took from twenty-five to thirty drops four times daily. We can also state that, while complaints of nausea were heard from thirty patients, no case is recorded as a failure where the iodine was not retained, and where its absorption was not made manifest by abundant evidences of its presence in the urine. Finally, it will be remembered, our dose of thirty drops is a little less than fifteen minims, the dose with which Dr. Morrison obtained his excellent results. (*Md. Med. Journal.*)

When we add that in a few cases the local application of iodine seemed to lessen the hepatic and splenic pains, we have described all the good we could derive from its use in *acute* malarial poisoning. As to its utility in *chronic* malarial poisoning we are not able to speak. Many of its advocates have said that here it does its great work in preventing the paroxysms which occur at irregular intervals, and in curing and preventing the splenic and hepatic changes. This we were in no position to investigate. Not all its supporters, however, hold this view by any means. Some claim for it a power in *acute* malaria superior to that of Peruvian bark; others are content with putting the two agents upon an equality. Our experience has not confirmed either of these statements. We are enabled to compare, in a measure, Peruvian bark and iodine, inasmuch as we gave cinchonidia or quinine to 52 of our cases, composed of 12 of the 13 relapses after benefit from iodine, 2 of those in whom the drug set up intolerable nausea, 1 to whom we gave cinchonidia because he was failing, and the 37 cases who were not benefited in five days.

Comparing, then, the two agents, we find the following to be the results of our investigations: I. Of 52 cases of acute malarial fever which iodine

failed to cure, cinchonidia arrested 38 promptly, and 10 after one paroxysm, but allowed a relapse in one case later. One case resisted cinchonidia for two days, and yielded at once to quinine. One continued to have a temperature of 101° for three days, but was suffering at the time from kidney trouble (XX.), while the last two resisted both cinchonidia and quinine, and wore themselves out in three or four weeks. (In regard to these last, one naturally thinks of typhoid fever. The *duration* of the fever, however, was the only characteristic of typhoid. Since this was the case, we made a diagnosis of remittent fever, although we failed to cure with quinine.) II. As to relapses, since our patients left early, we cannot speak with much assurance, specially as regards relapses after cures. However, of iodine this much we know: of 29 cases in which the slightest benefit accrued after the use of iodine, 13 relapsed, the intermittents on the 5th, 7th, 12th, and 14th days, while in the remittents the medicine seemed suddenly to lose all control over the fever.

A word about albuminuria. We found it in four cases. In each case, an examination of the urine, previous to giving iodine, had shown it to be healthy. In two of our cases the albumen was found only once, and in the other two it formed two very troublesome complications. The weight of authority seems to hold that albuminuria is not an ordinary complication in *acute* malarial poisoning. Dr. Bartholow (*Practice of Medicine*) speaks of a nephritic form of pernicious intermittent fever, and also states that albuminuria may result from chronic malarial poisoning. Bartels (*German Clinical Lectures*, New Syd. Soc., 1876, p. 211) says that, "in his experience malaria is the most frequent cause of chronic inflammatory enlargement of the kidney." In regard, however, to the occurrence of albuminuria in the course of an intermittent or remittent fever, Dr. McLean (*Reynolds's System of Medicine*) says, "it is extremely rare;" of remittent fever, Prof. DaCosta says (in his *Medical Diagnosis*), "at no stage does the urine contain albumen." In the *Philadelphia Medical News* of December 9, 1882, Dr. Fairfax Irwin (U. S. A.) gives an account of 90 cases of remittent fever which he treated in the South. Albuminuria did not occur in a single case. In view of these statements, in view of the fact that albumen was found in the urine after the iodine had been used, and since we always found the iodine in the urine while we were giving it, we are led to *suspect* that the iodine and albuminuria may stand in the relation of cause and effect.

There was a noticeable absence of pronounced "iodism" in our cases. Nausea, a few cases of diarrhœa, and some complaints about a "stuffy feeling like a cold in the head," and a "bad taste in the mouth" were the only symptoms of the malady with which we met.

Finally, from our experience we would draw the following deductions as to the use of iodine in *acute malarial poisoning*:—

(1) In intermittent fevers it has some feeble influence in controlling the paroxysms.

(2) It takes usually from three to eight days to exercise this influence.

(3) In *cures effected* there is great danger of a relapse; certainly as great as with Peruvian bark.

(4) It is certain to add to any existing diarrhoea or nausea, and is liable to cause each, if they do not already exist.

(5) In *remittents*, its effect, if any, is seen in a slow and gradual reduction of temperature, and this reduction is liable to sudden interruptions.

(6) In *both forms* of malarial fever it is infinitely inferior to either *cinchonidia* or *quinine*: certainly as regards the immediate control of the fever, and, as far as we were able to judge, as regards relapses also.

(7) From an economic point of view, the slowness and uncertainty of its action make its use in *hospital* practice fully as expensive as Peruvian bark.

(8) There seems to be some ground to believe that it can cause albuminuria.

(9) In the large majority of cases of ordinary acute malarial poisoning it has no influence whatever.

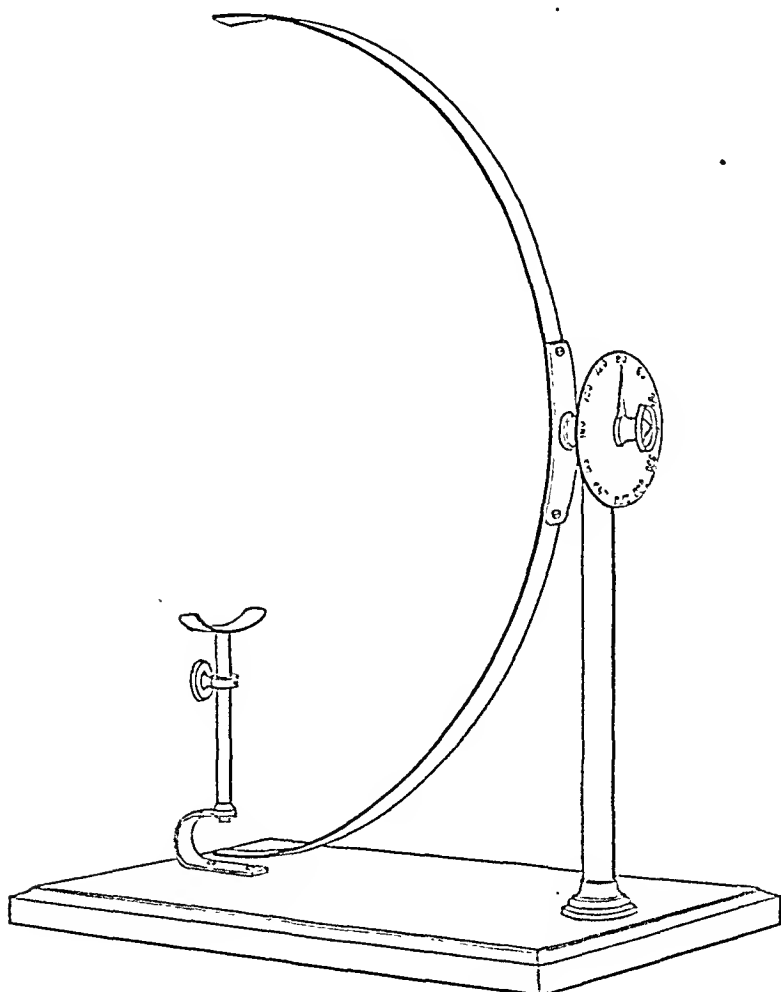
ARTICLE IV.

THE FIELD OF VISION. JAMES L. MINOR, M.D., Pathologist and Assistant Surgeon to the New York Eye and Ear Infirmary.

It is well known that, when the eye is fixed upon a stationary object, we see clearly only that part looked directly at; while surrounding zones are seen with increasing indistinctness as we pass from the point of fixation to the periphery of the view, until a point is reached where everything fades from our sight. The area thus obtained with a single eye is the *field of vision*, which is a map of the visual power of the entire retina, from the macula lutea to the ora serrata. The visual field (which we will designate V. F.) furnishing, as it does, a reflected (inverted) image of the perceptive power of the whole eye, is interesting in health and important in disease; for we here have to deal with an organ intimately connected, both anatomically and physiologically, with the brain, that participates with many, if not most, of the pathological processes affecting the latter, and shows such participation in a clear and demonstrable manner. Various methods have been resorted to for mapping-out the V. F. in such form as to admit of its being recorded on paper for permanent preservation. The fundamental principle is to have the eye under examination fixed upon a stationary point in front of it, while a movable object establishes the extreme limit of visual perception for the various meridians of the eye, thus mapping out the boundary of the V. F. A rough but convenient way is

to have the patient look at the tip of one of the examiner's fingers, held 12" in front of the eye, while, with a finger of the other hand, the peripheral limit of the V. F. is established. A still better method is to have the patient look at a small spot on a blackboard, 12" from the eye, while the V. F. is mapped out by a bit of white paper 1" sq. in a holder, and recorded with chalk on the blackboard, whence it can be transferred to paper. Both of these methods are objectionable. The first is too rough and inaccurate, and the second presents difficulties that it is hard or impossible to overcome. The blackboard is a plane surface; hence the peripheral test object, as it is carried from the point of fixation, will also be removed from the eye, so that it will often be necessary to increase the size of the test object to make it visible at so great a distance as it is necessary to place it. And, again, the limit of the V. F. in many eyes reaches

Fig. 1.



a point 90° from the centre of fixation; thus forming a right angle with the visual axis, which would bring about parallelism between the black-board and the limit of the V. F. in this locality.

The only reliable method of taking the V. F. is with a *perimeter*, and of these there are many varieties to choose from. The essential part of a perimeter is an arc of a circle, 180° in extent, and preferably of $12''$ radius, pivoted at its centre to an upright, which allows it to be turned to the different meridians desired. Beginning at the centre with 0° , each limb of the semicircle is marked off in degrees, up to 90° , at its end. A chin-rest is important, and it is convenient to have on the rear of the arc a stationary disk, with a series of radii, going around from 0° to 360° , with an indicator which moves with the arc, to show the meridian occupied by the arc in any given position. Such an instrument has been made for me by Mr. Schrauer of this city. It combines all of the requirements of a perfect perimeter with simplicity and cheapness.¹ A glance at the cut will render further description unnecessary. (See Fig. 1.)

To take the V. F., the patient places his chin on the chin-rest, and looks with the eye to be examined (the other eye being covered) at the small spot on the centre of the arc. A piece of white paper, $1''$ sq. in a simple holder, is moved from the periphery of the arc towards the centre, and the point at which it is first seen is noted. This is done with each limb of the semicircle in the desired meridian, usually six, and these measurements are recorded on a chart made for the purpose, which is laid out in radii and circles that are numbered so as to correspond to the perimetric measurements. (See Fig. 2.)

The normal central acuity of vision is in marked contrast with that in the periphery of the V. F. At $12''$ from the eye an area in the V. F. $\frac{1}{3}''$ by $\frac{1}{4}''$ would include that portion possessed of normal (central) vision. Within this space the normal eye can distinguish an object which subtends an angle of one minute upon the retina. An object subtending an angle of this extent, having been taken as the unit of visual acuity, it becomes an easy matter to measure the amount of reduction in sight when it is below the normal, by comparing the extent of the angle formed by the test-object used with that which is taken as the normal standard, *i. e.*, one minute. The size of the object (measured by the angle that it forms on the retina) will increase as the visual acuity diminishes.

For testing the acuity of vision in eccentric portions of the V. F., I used slips of white paper, on each of which were drawn three black square spots, the space between each spot being equal to the diameter of the spots which it separated. Each spot was of such size as would subtend an angle of one minute upon the retina; when viewed at the distance in feet, indicated by the number on the slip,² *e. g.*, No. 1, one foot from the

¹ A simplification of Forster's instrument.

² These squares represent cross-sections of the limbs of Snellen's test-letters.

eye would subtend an angle of one minute; No. 2 an angle of one minute at two feet; No. 100 at one hundred feet, etc. etc. Only normal eyes were examined. First, the limit of perception was mapped out, and this gave the *quantitative field*. Next, the *qualitative field*, or that portion of V. F. possessed of form perception, was determined in the following way: The slip of paper with spots which would subtend an angle of one minute, when seen at a distance of two hundred feet, and marked 200, was slowly brought from the periphery of the arc of the perimeter towards the centre, and the point at which the spots were recognized as three separate dots was noted, and vision at that point was set down as $\frac{1}{200}$; for an object which, when in the centre of the V. F., could be seen at 200 feet, had to be brought to a point one foot from the eye before it was recognized in this portion of the V. F. This was repeated for the various meridians, and thus the zone in the V. F., possessing vision of $\frac{1}{200}$, was determined. Then the next number, 100, was treated in the same manner, and the points at which its spots were recognized being noted, that portion of the V. F. possessing vision of $\frac{1}{100}$ was established. This was repeated for all of the different sized spots. The extent of each zone, in degrees upon the perimeter, is given in the following table:—

No. of slip.	Outer or temporal side of V. F.	Inner or nasal side of V. F.	Upper part of V. F.	Lower part of V. F.		Vision is
1 seen at	0°	0°	0°	0°	From centre	1
2 "	1	1	1	1	" "	$\frac{1}{2}$
3 "	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	$1\frac{1}{2}$	" "	$\frac{1}{3}$
4 "	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	$2\frac{1}{2}$	" "	$\frac{1}{4}$
5 "	3	3	3	3	" "	$\frac{1}{5}$
6 "	4	4	5	4	" "	$\frac{1}{6}$
8 "	6	6	6	6	" "	$\frac{1}{8}$
10 "	7	7	7	7	" "	$\frac{1}{10}$
15 "	8	8	8	8	" "	$\frac{1}{15}$
20 "	10	10	10	10	" "	$\frac{1}{20}$
30 "	15	15	15	15	" "	$\frac{1}{30}$
40 "	20	18	17	17	" "	$\frac{1}{40}$
50 "	25	23	20	20	" "	$\frac{1}{50}$
70 "	33	28	25	25	" "	$\frac{1}{70}$
100 "	38	34	30	30	" "	$\frac{1}{100}$
200 "	50	40	35	40	" "	$\frac{1}{200}$

This table is the averaged result of the examination of twelve eyes; and it differs but little from those obtained by Landolt, Dorr, Königshöfer, and others. An absolute standard cannot be established, but the above may be taken as a guide to what the eccentric vision should approach.

The foregoing method of testing was adopted because it was desired (1) to obtain results which would admit of comparison with the usual measurements of central vision, and (2) to eliminate the uncertainty

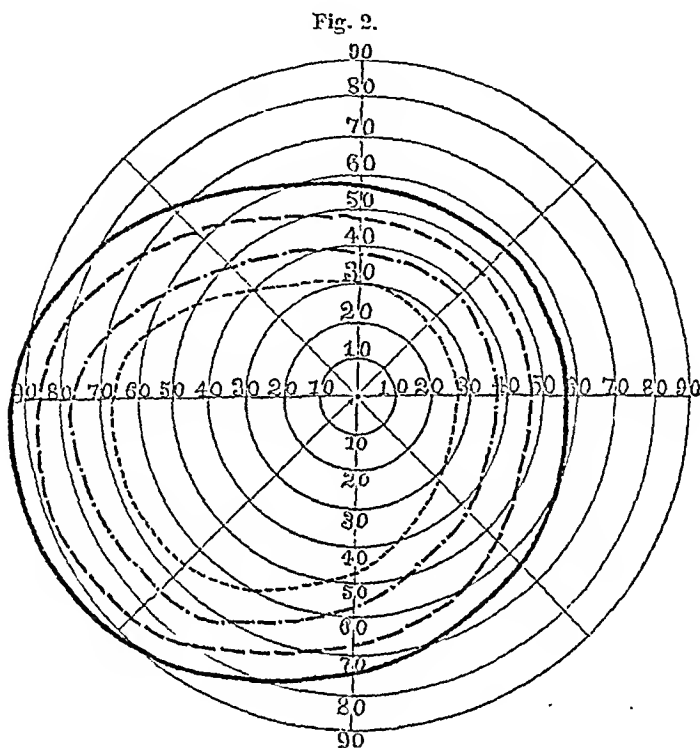
which attaches itself to tests in which the recognition of letters is taken as the standard. Test-letters are so constructed that the stroke or limb of each letter shall, when at a given distance from the retina, subtend an angle of one minute thereon; and the square spots used in these experiments were sections of a single limb or stroke of the test-letters in most general use (Snellen). Thus, the tests for central and peripheral vision were made to practically correspond. And as a clear recognition of a letter requires that the stroke or strokes composing it shall be clearly seen, it is necessary that a large part of the V. F. be occupied by the letter; and this involves an association of retinal zones, possessed of different degrees of visual acuity, for the recognition of a single object, while the squares represent that part of the letter which is taken as the unit of its measurement. Another advantage offered by the squares is that the accuracy of the tests can be verified by covering one or more of the spots during an examination of any zone. Certain variations will be found in the normal eye, dependent upon such conditions as differences in illumination, intelligence, and attention of the patient, and the amount of practice and education of the retina, as well as the patience of the examiner.

The cause of reduced vision in peripheral parts of the retina is to be explained on both optical and physiological grounds. When light passes obliquely into the eye, the nodal point is so changed as to prevent the formation of a distinct image; and the periphery of the retina is less experienced, and is inferior in anatomical construction to the central portions.

Not only is our form-sense much more acute in the centre of the V. F. but our perception of colour is far sharper here than elsewhere. Indeed our ability to distinguish colours diminishes so rapidly as we pass from the centre, that most observers claim that colours cannot be recognized in the extreme periphery of the V. F. Landolt, however, proved the falsity of this view, when he demonstrated the fact that the red, green, or blue of the spectrum, when isolated from other colours, in a darkened room, could be distinguished in the outermost limit of the V. F. It is not necessary to resort to the spectrum to prove this, for I have found that the colour of pure bright transmitted light, such as is obtained when the light from an argand burner passes through a piece of red, green, or blue glass, in a darkened room, is quickly recognized in the extreme limit of the V. F., at a distance of 12" from the eye.

To test the colour-field, a card of the desired colour, about 1" sq., is slowly brought from the periphery toward the centre, and the point at which its colour is first recognized is noted. This being done for the various meridians, and the points united, we have the extent of the colour-field. It will be found that a zone in the periphery of the V. F. exists, in which colours are not recognized by this test. It is due to a lack of purity and intensity of the colour, and not to colour-blindness. It will

be also noticed that certain colours can be distinguished at a greater distance from the centre—further in the periphery of the V. F.—than others. The field for blue is most extensive; next comes red, and finally green. It has been stated by various Americans who have written upon this subject, that the field for green is more extensive than that for red; and some European writers have fallen into the same error. (See Fig. 2.)



Having studied with some detail the acuity of vision in the normal V. F., it may be of interest to glance at some of the affections in which peripheral vision is reduced or destroyed. It is hardly necessary to mention that lesions of the eye, involving destruction or loss of function of the retina, are accompanied by blindness in that part of the V. F. corresponding to the retinal lesion. - Hence in many cases, and especially those in which a satisfactory ophthalmoscopic examination cannot be made, the V. F. is of material assistance in deciding the extent or locality of an *injury* inflicted by, or the presence of, a foreign body in the globe; a *retinal detachment*, *intra-ocular tumours*, or *hemorrhages*, and gross *circumscribed pathological changes* in the inner tunics of the eye. An *embolism* of one of the retinal vessels will be accompanied by blindness in that portion of the V. F. corresponding to its distribution. (The upper part of the V. F. corresponds to the lower portion of the retina, the tem-

poral side of the V. F. to the nasal side of the retina, and so on for other parts.)

In *cataract* the functional activity of the retina, as tested by a candle, or better, by the reflected light from a mirror, throughout the V. F., is a question which may decide for or against an operation.

In a certain form of *retinitis (pigmentosa)* the concentric limitation of the V. F. is peculiar and characteristic. Cases of this disease are often seen with good and sometimes perfect central vision, while the V. F. is reduced to an area not exceeding 10° or 15° in extent.

In *glaucoma* the V. F. is contracted, and most frequently on the nasal side. Often it is this symptom that decides the diagnosis in a doubtful case.

In *hemianopsia* (blindness in one-half of the V. F.) we often gain important information as to the locality of the intra-cranial lesion upon which it depends, by a study of the V. F. The most frequent form is *homonymous* hemianopsia, or blindness of corresponding halves of each V. F. (the nasal of one and the temporal of the other), and in these cases the lesion will be on the opposite side of the brain, involving either the optic tract or the cerebral substance further back. *Crossed* hemianopsia presents two varieties—first, absence of the *temporal* half, and, second, absence of the *nasal* half, of each eye. In the first variety the lesion involves the chiasm, and in the second, which is very rare, the lesion is a double one, involving each side of the chiasm or the outer side of each nerve.

In *migrain*, or sick headache, there are often transient attacks of blindness, or interruptions in the V. F., sometimes of a zigzag form, which is likened to a line of fortification. The cause of these phenomena is probably ischaemia of the retina. They are sometimes seen without headache or other symptoms.

In *optic neuritis* interruptions in the V. F. are common. They may be peripheral or central. The latter are called scotomata, and they are usually indicative of less gravity than peripheral limitations, which are as a rule followed by atrophy of the nerve.

In *optic nerve atrophy* defects in the V. F. are frequently seen, and most often they begin with peripheral limitation on the temporal side. Irregularity, such as sinuosity of outline, or scotomata, are suggestive of an unfavourable prognosis.

Amblyopic affections usually present irregularities in the V. F. that aid us in forming a prognosis. It may be said in general terms, that cases with peripheral contraction are progressive, and that those with perfectly outlined fields, either remain stationary or improve.

A more careful examination as to the *amount of vision* in the various parts of the V. F., will probably enable us to diagnose our cases with more accuracy, and to speak with greater positiveness about the prognosis in cases which are embraced under the last three headings.

All that can at present be claimed for *colour defects* in the V. F., of pathological origin, is that they are of material assistance as an aid to diagnosis, and that they help us in rendering a prognosis, when taken in connection with the other conditions, that go toward making up the case in question. Peripheral limitation of the colour-field, or inability to distinguish certain or all colours, in a circumscribed area (colour scotoma) or throughout the entire V. F., is of frequent occurrence in optic neuritis, in optic nerve atrophy, and in amblyopia. And the same rules that govern defects in the ordinary V. F., apply to abnormal colour perception. *Red* is the colour that usually suffers first, and *green* usually coincidently or next, and finally *blue*.

A *central scotoma for red*, complete or partial, accompanied with more or less marked intra-ocular appearances, is considered by many as being almost pathognomonic of *tobacco amblyopia*. In most of these cases alcohol will also have been used, and a low grade of optic neuritis can usually be detected.

Quinia, when given in large doses, sometimes causes narrowing of the V. F. and limitation of the colour-field or colour-blindness, and may cause total amaurosis.

The same effects are ascribed to *salicin*. The functions slowly return under the influence of time and proper treatment.

NEW YORK, December, 1882.

ARTICLE V.

SOME POINTS IN RELATION TO THE DIAGNOSTIC SIGNIFICANCE OF IMMOBILITY OF ONE VOCAL BAND; WITH ESPECIAL REFERENCE TO ANCHYLOSIS OF THE CRICO-ARYTENOID ARTICULATION AND ANEURISM OF THE ARCH OF THE AORTA: WITH SIX ILLUSTRATIVE CASES.¹ By SOLOMON SOLIS COHEN, A.M., M.D., Demonstrator of Pathology and Microscopy in the Philadelphia Polyclinic and College for Graduates in Medicine.

THE object of this paper is twofold: 1st, to show that laryngoscopy may sometimes be the sole, or most efficient means of diagnosis in affections located exterior to the larynx; and 2d, to point out that a liability to error might often be incurred, were we to place too exclusive a reliance upon the objective symptoms, as presented by the image seen in the laryngoscopic mirror.

These points, however, will not be treated of *in extenso*, or with any attempt at completeness; but a single phase of the subject will be illus-

¹ Presented as an Inaugural Thesis to the Faculty of Jefferson Medical College. Session 1882-1883.

trated by a group of cases not heretofore reported in this connection. These cases, while differing in aspects to be mentioned later, agreed very closely in the character of the picture seen upon laryngoscopic inspection; the principal and only well-marked feature of which was immobility of one vocal band.

As is well known, immobility of a vocal band is the result of one of two conditions: 1st, mechanical impediment to the movement of the arytenoid cartilage; 2d, want of power in the muscles acting upon that cartilage.

Excluding such obvious causes as the presence of a tumour or of a foreign body, excessive thickening of the inter-arytenoid fold, etc.; mechanical difficulty may arise from ankylosis (either true or false) of the crico-arytenoid joint; from destruction, more or less complete, of the articulation, or of the arytenoid cartilage; or from luxation of the arytenoid cartilage; of all of which conditions, instances have been reported.

Loss of muscular power may be either myopathic or neuropathic in origin. If defective innervation be the cause of the impairment, this condition may be due to disease or injury affecting the nervous system, or may be merely a secondary effect, resulting mechanically from pressure exerted upon a nerve trunk by a consolidated lung, an aneurism, a tumour, or an enlarged gland, etc. The seat of the lesion or pressure, may be central, or at some portion of the course of the fibres transmitting motor impressions; whether these fibres be known in that particular situation under the name of spinal accessory, pneumogastric, or recurrent laryngeal.

Poisoning by lead, and perhaps other toxic agents, may also be the cause of vocal paralyses, and without being able to indicate the exact *modus operandi* in such instances, we may, in passing, mention them as among the possibilities to be considered.

Some of the conditions here indicated will not be again alluded to, as they would give rise to manifestations beyond the larynx sufficiently prominent to attract attention, and sufficiently characteristic to render the diagnosis comparatively easy. Nor is it purposed to enter upon the characteristics by which different forms of muscular and nervous paralyses are differentiated; these being, for the most part, sufficiently obvious upon consideration of the anatomy and physiology of the parts. In order to restrict this paper within reasonable limits, attention will be directed only to the means by which, in certain cases, a conclusion may be reached as to what may be termed the gross character of the lesion; the finer details being considered merely in so far as they may have a direct bearing on this subject.

With this object in view, it seems appropriate to introduce at this juncture, the histories of the cases from which our deductions will be drawn.

CASE I. *Ankylosis of the Left Crico-Arytenoid Articulation; probably due to Extension of the Inflammatory Process in a case of Chronic Laryngitis.*—C. S. G., æt. 23, clerk, applied to Dr. J. Solis Cohen May 27,

1881, giving the following history: He had enjoyed fairly good health until about sixteen years old. At that time, he contracted from exposure, what was probably a naso-pharyngeal catarrh, the inflammation involving, also, the Eustachian tubes; for he states that he experienced in addition to nasal symptoms, a disagreeable sense of fullness in both ears, and that the physician under whose care he then placed himself, treated him exclusively for ear-trouble, but without affording relief.

As frequently happens in such cases, the larynx became slowly involved; and in the spring of 1879, he first noticed a huskiness in his voice. This huskiness gradually increased, becoming attended with dysphonia, until considerable and painful effort was necessary in order to carry on conversation; and in the fall of 1880, he became completely aphonic. His general health having greatly deteriorated, he made a trip to Texas, from which he derived considerable benefit; his voice sharing in the general improvement.

His condition on applying to Dr. Cohen, was as follows: His voice was hoarse and rough, but distinct and easily heard. It was deficient in tone and power, and any extended use of it would cause the throat to feel tired and sore, while respiration would become slightly embarrassed. When, however, the nasal passages seemed to be clogged with mucus, so that respiration was less free than usual, the voice sounded clearer and stronger, and the throat did not tire so quickly. Owing to his nasal catarrh, the sense of smell was slightly impaired, and nasal respiration always somewhat obstructed. Fullness in the ears, unattended with pain, was a not infrequent symptom. There was no cough, and deglutition was not painful. Appetite was good, and nutrition seemed to be well carried on. The muscles of the right side of the neck and face appeared to have undergone hypertrophic development; probably from the increased action necessary to bring the vocal bands into approximation.

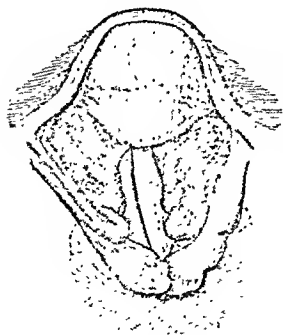
On laryngoscopic examination, the mucous membrane of the larynx presented evidences of chronic inflammation, and there was seen to be moderate tumefaction of the ary-epiglottic folds, ventricular bands and arytenoid eminences. The right ary-epiglottic fold was extremely tense. The left ventricular band exhibited a peculiar fold or knuckle, posteriorly, which became more marked on phonation; when it was also seen that the left vocal band remained immobile in abduction, the right band

crossing the median line, its upper surface being on a plane almost inappreciably lower than that of the left band; while the right arytenoid cartilage was swung to the inside and in front of the left arytenoid cartilage. This appearance, almost as difficult to depict as to explain, is shown in the accompanying drawing, Fig. 1; for which, the writer is indebted to the artistic skill of an undergraduate of the College, Mr. Max. J. Stern.

No sign of cardiac or pulmonary lesion, of aneurism or intra-thoracic tumour, could be discovered, nor were any enlarged glands found in the neck. The urine was examined with negative results. Attempts to move the left

arytenoid cartilage by direct pressure were unsuccessful; and while the catarrhal condition yielded to appropriate remedies, prolonged treatment

Fig. 1.



by means of both galvanic and faradic currents, as well as the internal administration of strychnine, failed to restore in the slightest degree the mobility of the affected vocal band.

CASE II. *Anchylosis of the Right Crico-Arytenoid Articulation, due to prolonged enforced inaction, consequent upon Fibroma of the Right Vocal Band.* Reported by Dr. J. SOLIS COHEN.—W. B., æt. 26, shoemaker, applied to Dr. Cohen May 1, 1867, to be treated for loss of voice of more than two years' duration. Laryngoscopic inspection having revealed the existence of a neoplasm occupying the entire length of the right vocal band, thyrotomy was performed, and the growth was removed. The patient's voice, though improved by the operation, was still aphonic. On laryngoscopic examination, the band from which the tumour had been removed was seen to be immobile in abduction, and slightly above the level of that of the opposite side. A peculiar angular fold which had been noticed at the posterior portion of the free border of the right ventricular band, and had been attributed to its being pushed out of shape by the tumour, was seen to be persistent. No effect being produced by treatment, Dr. Cohen concluded that during the development of the neoplasm, the crico-arytenoid articulation had become ankylosed. This opinion was verified by Dr. R. J. Levis, who had assisted at the operation, and who now, at Dr. Cohen's request, placed his forefinger, "which is a long one," upon the arytenoid cartilages, and succeeded in moving that of the left side, while that of the right side remained fixed.—*Med. Record*, July 1, 1869.

CASE III. *Aneurism of the Arch of the Aorta compressing the Left Pneumogastric and Recurrent Laryngeal Nerves; Left Vocal Band immobile in Abduction. Death from Rupture of the Sac.*—A. J., æt. 60, sailor, applied to the Throat Clinic of the Jefferson Medical College Hospital, July 1, 1881, for the relief of hoarseness and dyspnoea which had persisted since the previous October, in association with violent attacks of coughing. He attributed the origin of his trouble to exposure, resulting in a severe cold. There was a history of a venereal sore contracted forty years previously, but there had never been any secondary symptoms in evidence of syphilitic infection. He had several times suffered with rheumatism, a severe attack in 1864 lasting for two months. He had followed the sea for forty years without other sickness.

His breathing was stridulous, especially during sleep; dyspnoea was marked, increasing in the recumbent position, so that he was compelled to sleep propped up with pillows. There was severe pain on the left side of the chest, front, and back, increasing at night. At times he complained of pain in the left hip and in the lower third of the left thigh. He had lost flesh, being reduced from 182 pounds to 150 pounds. His appetite was poor, but he had been a dyspeptic for years. Any attempt at laryngoscopic examination provoked an attack of coughing and dyspnoea, so severe as to completely prostrate him; thus leading to suspicion of paralysis of the posterior crico-arytenoid muscles. After some days, however, he became more tolerant, and with delicate manipulation it was possible to conduct a rapid examination. It was thus gradually ascertained that the left vocal band was immobile in abduction, while the right vocal band performed its movements in a somewhat jerky and spasmodic manner. On inspection of the chest, a prominence was noticed in the sternal region, extending from the clavicle to the level of the fourth sterno-chondral articulation, most marked at the level of the third sterno-chondral articulation. No satisfactory information could be obtained, however, as to the length of time for which this condition had existed, or as to whether or not it had been congenital. Percussion elicited slight

dulness anteriorly on both sides as far down as the fourth rib. On auscultation tubular breathing was heard in the right infra-clavicular region. The expiratory sounds were very feeble on both sides.

The heart sounds were normal, but the second sound was distinctly heard two and one-half inches to the right of the sternum. No difference was discernible between the radial pulses or between the pupils. Examination of the urine gave negative results.

This case was presented to the Philadelphia Laryngological Association, and held by competent observers to be one of crico-arytenoid ankylosis. The extreme irritability of the larynx prevented a successful attempt to verify or disprove this diagnosis by the application of direct pressure.

Although it was endeavoured to keep this patient under constant observation, his unwillingness to enter the hospital on the one hand, and the irregularity of his attendance upon the clinic—caused by the relief afforded by palliative treatment—on the other hand, rendered it impossible to do so. After an unusually prolonged absence, an attempt to trace his whereabouts revealed the fact that his death had occurred during a profuse hemorrhage, about ten days previously (August, 1882). The physician who was called in the emergency, reports that there was spitting of blood for two days, after which came the fatal hemorrhage, by him suspected to be of pulmonary origin. *Post-mortem* examination was not permitted.

CASE IV. *Aneurism of the Arch of the Aorta compressing the Left Recurrent Laryngeal Nerve; Left Vocal Band Immobile in Abduction.*—W. M. K., æt. 57, farmer, presented himself September 13, 1882, at the Throat Clinic of the Jefferson Medical College Hospital; and on the following day was made the subject of a clinical lecture to the class, by Dr. J. Solis Cohen.

In May, 1881, this patient became hoarse while at work, after profuse perspiration. In the last four weeks dyspnoea had developed. There was no cough, and no difficulty in deglutition. The patient's general health and family record were good. Syphilis was at first denied, but upon cross-questioning a history of constitutional symptoms was obtained. He had also suffered a number of years ago with rheumatism.

Laryngoscopic examination revealed the left vocal band immobile in abduction. This led to the suspicion of aneurism of the arch of the aorta, and upon physical exploration of the chest the suspicion became a certainty; thrill and bruit being unmistakably present. The pulse was also characteristic of aneurism. The patient was placed in one of the wards of the hospital under the care of Dr. Cohen, and as the result of appropriate treatment rapidly improved. Dr. Charles Meigs Wilson, the resident physician, reports that when he was discharged at his own request, after six weeks' confinement to bed, the dyspnoea had disappeared, the voice was stronger, the equality of the pulses restored, and the signs in the chest scarcely perceptible.

CASE V. *Aneurism of the Arch of the Aorta, compressing the Left Pneumogastric and Recurrent Laryngeal Nerves; Cadaveric position of the Left Vocal Band; Sudden Death from Asphyxia; Autopsy.* Reported by Dr. C. E. BEAN.—R. C., æt. 42, engineer, presented himself Sept. 29, 1880, at the Throat Clinic of the Jefferson Medical College Hospital, under the charge of Dr. J. Solis Cohen. In December, 1878, the boiler of which he had care exploded, and after working for several hours in the heat and steam, he became chilled upon exposure to the night air. Two days later his voice became hoarse, getting gradually worse, until at the end of a week there was complete aphonia; but at no time was there any pain or soreness in the throat. Dysphagia soon became

a prominent symptom. About a week after the explosion he began to cough, expectorating thick frothy mucus. Three months later he first experienced a sense of fulness in the upper part of the chest, just behind the sternum. Respiration was not materially interfered with. The cough, though occasionally wheezing, had assumed a ringing metallic character. Laryngoscopic examination showed fixation of the left vocal band in the cadaveric position.

Thrills were detected below the clavicles, synchronous with the pulse, but these signs disappeared the day after the patient was put to bed. There was no perceptible difference between the radial pulses. The heart sounds were normal. The left pupil was markedly contracted, but this had been the case as far back as the patient's recollection extended. A diagnosis of aneurism of the arch of the aorta was made, but its correctness was disputed by several experienced and qualified observers who made careful examination of the case.

The patient died suddenly Nov. 13, "gasping for breath, unconscious, face and neck very much congested," despite the performance of tracheotomy by the resident physician of the hospital, who reports the case, and who had been hastily summoned in the emergency.

The following is the report of the conditions found on *post-mortem* examination:—

"The apex of the heart corresponded to the left sixth intercostal space, one inch beyond the line of the nipple. The upper part of the anterior mediastinal space was broadened and filled with a fluctuating mass, commencing at the upper border of the pericardium and extending to the sternal notch. The heart and lungs with the descending aorta were removed *en masse*. It was found that the aorta was dilated into a large sac, commencing just above the valves and involving the arch to a point beyond the left subclavian artery. The sac of the aneurism was tightly adherent on the left side of the second and third dorsal vertebrae. On removing the mass, the wall of the sac was found to have disappeared at this point. The aneurism had deflected the lower portion of the trachea strongly to the right, and pressed mostly on the root of the right lung. On looking into the trachea it was seen that its calibre was nearly closed by pressure. Examining the interior of the aneurismal sac, the lower tracheal rings partly calcified had been laid bare and eroded by the pulsation. They protruded with the aneurismal cavity. The left pneumogastric nerve was found running over the aneurism, and had been evidently much pressed upon. The right nerve was less involved. A large ante-mortem clot was discovered in the sac."—*Louisville Med. News*, Jan. 22, 1881.

CASE VI. *Aneurism of the Arch of the Aorta compressing the Left Recurrent Laryngeal Nerve; Left Vocal Band immobile in Abduction.* Reported by Dr. C. E. BEAN.—J. S., æt 70, weaver, applied to Dr. J. Solis Cohen May 17, 1882, for the relief of hoarseness. Sept. 17, 1879, after lifting heavy rolls of carpet, he felt "a peculiar heavy stroke of the heart, and a sense of extreme weakness, so that he 'came near fainting.'" This soon passed away. One week later, two similar attacks occurred. Soon after this hoarseness set in, becoming gradually worse. At the time of examination there was slight dysphonia, and the voice was a falsetto. For several months, even during warm weather, the patient's feet had been cold, but, with this exception, his general condition was good.

Laryngoscopic examination showed the left vocal band immobile in abduction.

Inspection of the chest revealed nothing abnormal. On auscultation, a blowing sound was heard in the second intercostal space, $\frac{1}{2}$ inch to $\frac{3}{4}$ inch to the left of the sternum. This sound was synchronous with the ventricular systole. Inspiration was found to be shrill at the second sterno-chondral articulation, and percussion elicited marked dullness over the same region. Palpation failed to discover thrills or pulsation.

The pulse was 70 and feeble, that of the left side being scarcely perceptible, and lagging one-fourth of a beat behind that of the right side. There was no difference between the pupils. A considerable quantity of sugar was found in the urine.

Marked improvement took place under treatment directed against the condition of aneurism, but the patient became impatient of confinement to bed, and,

contrary to advice, resumed his usual occupations. At last accounts he was still living, and, except for slight hoarseness, perfectly satisfied with his condition.—*Med. and Surg. Reporter*, June 10, 1882.

In reviewing the cases presented in the foregoing pages, there are a few points of special interest to be noticed in each, which it may be well to consider in logical rather than numerical order.

Case II. demonstrates the possibility of ankylosis taking place in the crico-arytenoid joint simply from prolonged inaction. The history, the absence of any other local or systemic disturbance, the failure to respond to treatment, and, finally, the *experimentum crucis* of the application of direct pressure, all place the diagnosis beyond doubt.

Case I. The history of pre-existing, long-continued chronic laryngitis rendered two views within the bounds of possibility: 1st. Myopathic paresis of the crico-arytenoideus lateralis, resulting from extension of the inflammatory process; 2d. Ankylosis of the crico-arytenoid articulation from a similar cause. Apart from the greater improbability of the former opinion, the failure to respond to treatment would be against it; while, as in Case II., the diagnosis seems to be fully established by the *experimentum crucis*.

In both these cases, there are certain points connected with the laryngoscopic image deserving of attention. The vocal band of the affected side occupied a higher level than that of the other side. Can this be explained upon the supposition of inflammatory deposit within the joint, and is it to be considered pathognomonic? This would seem well worthy of observation in future studies of this rare affection. Furthermore, the peculiar fold or knuckle in the ventricular band of the affected side, occurring in cases so far removed in time, and owing to such different causes, would appear to be more than a mere coincidence.

Still another symptom, not mentioned in the *résumé* of Case II. because not bearing on the subject then in hand, yet shared by both of the cases now under discussion, is of interest in connection with the general topic of mechanical impediment to the movement of the vocal bands.

Previous to the removal of the tumour from his right vocal band, the patient was compelled to draw his head and neck well down toward his right shoulder in order to produce his aphonic whisper to the best advantage; though subsequent to the operation this was no longer necessary. In Case I. the left vocal band was immobile, and the patient spoke with his head slightly inclined downward and to the left; the muscles of the right side of the face and neck, as previously stated, being noticeably hypertrophied. This point also appears worthy of remembrance in future observations.

Case V. possesses a high degree of interest, inasmuch as the existence of an aneurism of the arch of the aorta was suggested to a laryngoscopist in a diagnosis by exclusion, of the condition leading to what is usually

termed unilateral vocal paralysis. While the rational symptoms were confirmatory of this opinion, the entire absence of the usual physical signs of aneurism caused experts in physical diagnosis, unfamiliar with laryngoscopy, to doubt its correctness. This case alone fully exemplifies the two texts of this paper; for by relying solely upon the laryngoscopic image the diagnosis would have been neurotic paralysis, while failure to examine the larynx, or to give due weight to its testimony, would have rendered it unlikely for aneurism to have been surmised in the absence of the phenomena usually associated with that affection; there being neither tumour, bruit, nor thrill.

In Case VI. again we have apparent laryngeal disease leading to the discovery of an aneurism which might otherwise not have been detected. The probable small size of the sac, or its favourable situation, prevented compression of the trachea or œsophagus. The pneumogastric trunk not being subject to pressure, another possible cause of cough and dyspnoea was eliminated; hence, the only symptoms attracting the patient's attention were the persistent hoarseness, and the deficient peripheral circulation—the latter condition, however, being easily attributable to old age. The presence of sugar in the urine, probably from reflex irritation of the pneumogastric nucleus in the floor of the fourth ventricle, was confirmatory of the diagnosis; but, as shown by other cases, this sign is not invariably present. The only one of the ordinary physical signs of aneurism exhibited by this case, was the blowing sound in the left second intercostal space.

Case III. is so obscure that in the absence of an autopsy it is impossible to definitely decide its true nature; nor can any one hypothesis explain it fully. Disregarding for the purposes of this paper any possible complication not directly bearing upon the lesion manifested by the laryngeal symptoms, the manner of death would point to aortic aneurism; and upon this supposition the dyspnoea can be explained as the result of compression of the trachea, while the tubular breathing in the right infra-clavicular region may be accounted for by pressure exerted upon the air-vesicles in that situation. To the sternal bulging no weight can be attached. The history of rheumatism, while it favoured somewhat the view of aneurism, might likewise, especially in connection with the chronic laryngitis following subacute laryngitis due to direct exposure, have strengthened the view of anehylosis; while evidences of nervous disturbance might have justified the reference of cough and dyspnoea to disease of the pneumogastric trunk. The intensity of these symptoms at first, and their amelioration under medication, point at least to partial nervous origin; probably a secondary effect of the pressure of the aneurism upon the nerves, exactly similar to the immobility of the vocal band. The fact that the position in which the band was fixed was not cadaveric, but that of abduction, is of interest, illustrating (as do Cases IV. and VI.)

the greater liability to impairment of the adductor, over the abductor; filaments of the recurrent laryngeal nerve; a clinical point to which attention has been prominently directed of late years. An intra-thoracic neoplasm might have produced the same mechanical effects as an aneurism; but it is difficult to imagine a morbid growth of sufficient size occupying just this situation, and giving rise to no definite manifestations elsewhere in the economy.

In Case IV., also, we have aneurism detected by means of the laryngoscope; the patient complaining merely of hoarseness and slight dyspnoea. But the evidences of aneurism were so distinct, that the diagnosis presented no difficulty, and might have been made without laryngoscopic assistance.

In three of these cases of aneurism, it is interesting to note that exposure very likely to lead to ordinary subacute laryngitis preceded the laryngeal symptoms, thus causing the patients to imagine that they had simply "caught a bad cold;" and well calculated to mislead the physician; especially had the larynx not been examined.

The question arises, in this connection, whether the exposure and resulting inflammation precipitated the laryngeal complications of the aneurism, or whether the condition of paralysis had not been pre-existent, thus rendering recovery from the inflammatory hoarseness protracted, if not impossible.

In two cases we have history of preceding rheumatism; in one, of syphilis as well.

Finally, to generalize from all the cases herewith presented, generalizations which are warranted by the recorded observations of several authors, we may conclude:—

I. That whenever the left vocal band is immobile in abduction, or in the cadaveric position (positions in which the patency of the glottis is not interfered with), and there is cough or dyspnoea (or both), without cardiac or pulmonary lesion to account for these symptoms, we are justified in suspecting aneurism of the aortic arch; and difficult deglutition will be almost certainly confirmatory of the diagnosis, notwithstanding the absence of tumour, pulsation, thrill, and *bruit*. The only, and exceedingly improbable source of error, would be intra-thoracic neoplasm.

II. That ankylosis of the crico-arytenoid articulation may fairly be suspected in cases of immobility of one vocal band, not referable to mechanical interference with the transmission of nervous force; unaccompanied with evidence of central or local nervous disease; and in which failure to respond to appropriate treatment will warrant us in excluding muscular atrophy. But the diagnosis can be finally established only by the application of direct pressure to the affected arytenoid cartilage.

III. That whenever one vocal band is immobile in the cadaveric position or in abduction, and there are no other signs or symptoms to

assist the diagnosis, ankylosis being eliminated, we should not be satisfied with a diagnosis of neuropathic paralysis; but should keep the patient under observation, with a view to detecting the earliest manifestation of aneurism, consolidated lung, or other mechanical cause for the impaired innervation.

NOTE.—Since the above was written, a case has presented itself (Jan. 29, 1883) at the Throat Clinic of the College Hospital, in which an aneurism of the innominate artery, involving as well the first portion of the right subclavian artery, around which latter winds the right recurrent laryngeal nerve, has, by compressing that nerve, produced cadaveric paralysis of the right vocal band. The voice of this patient has a peculiar shrill tone, and in the act of phonation he carries his head downward and well over to the left. There is a pulsatile tumour just behind the sterno-clavicular articulation, extending laterally about two inches from the median line, rising about one and a quarter inches above the clavicle, and projecting about one-quarter of an inch.

ARTICLE VI.

A CASE OF PRIMARY MONOMANIA (Primäre Verrücktheit). By C. B. BURR, M.D., Asst. Physician to the Eastern Michigan Asylum, Pontiac.

THE circumstances connected with the trial of Guiteau brought prominently to notice a peculiar form of insanity, the so-called primary monomania. In view of the professional interest attaching to this variety of mental disease, the following case is reported:—

K., age 40, was born in New York. His father was of Irish birth, a drunkard, and abusive in his family. His mother was of English descent, but a native of New Jersey; one of a family that is said by the patient to have inherited upward of seventy millions of dollars (?) which cannot be recovered. The early life of the boy was one of hardship, privation, and suffering, and his surroundings were such as to leave enduring unpleasant impressions in his mind. Through the neglect and cruelty of the father the family was separated early. He at the age of eight years was bound out to a mechanic with whom he remained until he was fifteen. After this period he worked at different trades, but showed no capacity for instruction, could not apply himself, and failed to succeed. He hired out to one employer and another, but his “mind was roaming all over the world;” he was restless, unsettled, and governed by impulses. In this mental state he made his way to New York, and shipping on a sailing vessel made a six weeks’ voyage. He ascended the Mississippi from New Orleans,

came across the intervening States to Michigan, and took up his residence with an uncle in Grand Haven. There he remained for one year; for the next four he resided in different parts of Connecticut and New York. During this latter period he received his only schooling, studying the ordinary branches of reading, spelling, and arithmetic.

At the age of twenty-one he was living in Jackson, Mich. Here, as near as can be ascertained from his own account, mental alienation became pronounced. A fixed light appeared to him "coming from the morning and evening stars, descending in the shape of a heart." He was at first dazed and bewildered, and at a loss to account for this strange manifestation; then he set about diligently to discover an explanation. He scrutinized his own condition carefully, was critical and morbidly suspicious of others. A recurrence of the visual hallucination rendered him still more thoughtful. He experienced strange sensations and felt a consciousness of being no longer his former self. What could produce such a change? He could account for it only on the supposition that a miracle was being wrought, and it dawned upon him at once that he was "inspired."

The most trifling circumstances confirmed him in this view. The mere mention of his name by one in conversation had a peculiar significance; a look, a glance, or a casual inquiry impressed him deeply, and he drew absurd conclusions from the most innocent remarks. Conceiving himself of necessity an object of great interest, he imagined his affairs were the topic of general conversation. The sight of persons talking together in the street aroused in his mind the belief that a conspiracy was forming against him, a look or gesture being sufficient to convey such important intelligence. He heard his name repeatedly mentioned by men of prominence, and concluded that if he were not the object of their active enmity at least there were special reasons why they should be talking and thinking about him.

Castling about for an explanation of imaginary slights, it was revealed to him that his secret liking for a young lady, the daughter of a wealthy farmer, had been divined, and that a "campaign" was being inaugurated to force him to leave the country. He was naturally bashful, retiring, reserved, and ill at ease in female society, but at this period there seem to have been several ladies whose destinies he imagined in some way involved with his own. There were none to whom he paid active court; indeed with many he had not even a speaking acquaintance; but a toss of the head, a glance, the jostling incident to a crowded place, gave him a peculiar thrill, and caused him to understand the deep regard in which he was held.

In 1861 he enlisted in the army. Here, according to his own account contained in a pamphlet entitled "*The Hero of Seven Battles*," he was many times the object of special interposition of Providence, having been miraculously rescued for some great purpose. "Persecution" followed

him into the service. His comrades, envious of his attainments and unwilling to see him promoted, threw obstacles in the way of his advancement. Being compelled to remain in the ranks, while believing himself fitted to hold the most responsible position in the service, he was rendered restless and unhappy. He was importunate in his demands for promotion, and sought from officers high in authority a recognition of his claims. Because these were disregarded, he argued a lack of patriotism on the part of those in command, and believed this but a part of the "conspiracy to crush" him. These unpatriotic acts were not allowed to go unpunished. He saw those who had reviled and scoffed at him stricken down by bullets; he saw officers who had refused him audience, denied his requests or dealt harshly with him, superseded in command. He avers that the reverses which befell General Porter and General McClellan were the direct outcome of their unjustifiable treatment of him.

For six months after his discharge he was an inmate of the government hospital for the insane at Washington. Upon his return home he took (like many another crank) to literary (?) pursuits, and travelled through Indiana with a lecture on "War." This tour did not prove a financial success. Rough-looking fellows "in solid columns" demanded admission to his lectures without paying the fee, and, being indulged, showed their gratitude by breaking up the meetings. On such occasions the orator barely escaped with his life.

He next adopted the occupation of peddling, and in going about from place to place was the recipient of many, to him, singular and significant experiences. Many people at this time in his opinion held him a veritable Saviour.

In obedience to a demand on the part of the people for correct information on the subject of the war, and his own part therein, he wrote the pamphlet alluded to: "The Ways of the World being a Life of — —, the Hero of Seven Battles." This is an illiterate, disconnected, self-laudatory composition, and was used in the probate court to substantiate his insanity. A careful scrutiny of its pages fails to bring to light any act which would be accounted by a sane man especially heroic.

Eight years ago he married. He was scarcely acquainted with his wife previous to marriage, and, owing to excessive embarrassment on his part, the engagement was made wholly through the medium of correspondence. Fortunately no children have been born of this union.

His reputation in his own neighbourhood is excellent. It is said that few are more honest and straightforward in business matters. He is also of good habits. He succeeded at one time in accumulating a fair property, but did not show good judgment in managing it. He seems to have had expansive ideas; at least on one occasion he placed a mortgage upon unencumbered real estate which was supporting him well, in order to make additional purchases and accommodate an impecunious brother-in-law.

For many years he has been regarded peculiar, erratic, visionary, and eccentric, if not actually insane; the character of his book and his claim of inspiration being the main grounds upon which these judgments were based. All had believed, however, that lunacy, if present, was of a "harmless" type.

The immediate cause of his commitment to the asylum was the shooting of one who had been appointed a special guardian for the purpose of prosecuting his claim for a pension. On investigation it was discovered that he was not entitled to government aid on the ground of mental infirmity, as this antedated his army service. He, however, conceived that either negotiations for the pension were delayed by reason of the neglect or inefficiency of his guardian, or that the money had been paid and withheld from him. At the same time also (entertaining possibly the vague dread which one half-conscious of insanity feels) he became fearful that he would be sent to an asylum through the machinations of this same man. Meeting him in the street one day, he asked him what he had done with his pension money. The guardian replying that he had never received any, he said, "you are trying to beat me out of it." This was denied. He thereupon called him "a liar," and shot him with a revolver he had long been accustomed to carry. He was in debt to his guardian for borrowed money. It is impossible to say whether this fact furnished an additional motive for the commission of the crime.

After the shooting he fled to avoid arrest, travelling mainly at night. To obtain food he was occasionally necessitated to call at farm-houses. To account for his presence at such places at unseasonable hours, he gave out that he was searching for a stolen horse, or invented other plausible excuses. Hearing that his shot had not proved fatal, he returned voluntarily, gave himself up, and was lodged in jail. There he was pleasant and composed, but inclined to talk of inspiration, and declaim against his associates, by whose presence he thought himself very much degraded. He expressed no actual remorse for the shooting, but said if he ever lived to get home he would injure no man again.

It now came to light that he had long contemplated murder for the righting of his wrongs. He had twice visited his guardian's house with the intention of "forcing him to a settlement" of his claims at all hazards, and had carried arms to be used in case the emergency demanded. With a loaded shot-gun he also called at the office of the judge of probate, but the outer door, moved by the wind, slammed in his face, and he turned away filled with superstitious dread, not daring to enter.

His condition on admission was as follows: Of medium height; personal appearance neat; temperature and circulation normal; respiratory murmur harsh at the apices of the lungs; in good flesh, but troubled with a cough; had a coated tongue, and suffered slightly from constipation; pupils dilated; vision in right eye defective; head small and misshapen; there

were numerous scars on his person, one being on the forehead ; expression of countenance attentive, watchful, and somewhat suspicious ; replies prompt, but guarded, and he seemed distrustful ; coherency somewhat impaired ; memory good ; general character of conversation rambling, and chiefly relating to delusions ; questions as to his business, property, or current events answered rationally. He was very much pleased by any expression of interest in his delusions, and did not hesitate to lay claim to inspiration ; was very desirous of enlisting some great man in the work to which he himself had been assigned.

His expression of countenance was a variable one. In speaking of his delusions, his face lighted up and he exhibited considerable animation. There was a settled look of suspicion, however, and in conversation he was confidential. He gave furtive glances over his shoulder from time to time as if fearing to be overheard. His mental characteristics have been and continue as follows : He is quiet and free from irritability ; is industrious, helpful, and considerate. To feeble patients he is kind and obliging. He is much given to writing, and has composed a large amount of manuscript, which he calls a history of his life. Its style is grandiloquent and egotistic.

He prefaces a biographical sketch with the statement that his life is now in great demand, and asks why he is expected to write the history of so great a life, adding that he never, *as yet*, held any public office or killed anybody. His answer is that "the characteristic nature of my life is and has been so queer from any other man's life, that is the reason why it is in such great demand." He relates in this "paper" how he made application for a pension on the ground of insanity, and how he advocated the appointment of a guardian. He fully believes himself inspired, and interlards such expressions as these, "I must not write so great a paper as this will be, without mentioning God the ruler of the universe, his gifts to me, and yet I am satisfied there is something great in store for me yet." "A forewarning of enemies in my dreams is one of God's gifts to me, so understand me I know to whom is my friends by my Dreams." He believes that he has seen God, having had in the dead of night the impression of a "bright light" and "an eye wide open" resting on him. He believes the physicians are able to read his mind and can "look right into" his brain.

The hallucination in respect to the "bright light" descending in the shape of a heart" persists. This is now seen in connection with any luminous body, is with him almost constantly, and, to use his own expression, "shines on," leading him to the belief that there is for him "some great thing in store in the future."

He has not an exalted religious sentiment. He plays games and enjoys amusements, does not hold himself aloof from others, is not given to cant, does not read his Bible excessively, is free from hypocrisy, and while laying claim to inspiration, does not assert his views in an offensive way,

and is tolerant of the opinions of others. He is comparatively free from personal vanity, and does not care for ostentatious display. He has an appreciation of the conditions of other patients, and is considerate to all. He is self-controlled and forgiving. His sympathies are readily enlisted. He shows no tendency to do impulsive acts, and preserves composure even under provocation. He cherishes the belief that a great work was done in his attempt upon the life of his guardian. He has not once expressed remorse for the deed, but has said he was glad the wound was not mortal.

At present he is as comfortable in all probability as at any time during the past twenty years. No radical improvement in his mental symptoms has occurred, but his delusions are not especially active. There seems little prospect of future benefit from treatment. He would be able to perform regular physical labour, control himself under the ordinary emergencies of life and support himself and wife, but a serious obstacle stands in the way of his discharge. Previous to his assault he was considered a harmless, good-natured lunatic, whom no one need fear. This homicidal act has changed the current of sentiment among his former neighbours, and they no longer desire his presence at home. The harmless person "sane on all subjects but one," is transformed into a homicidal lunatic, menacing the safety of society. Is it not time that the medical profession lent its aid to eradicating the prevalent and pernicious belief, that a condition of sanity "on all subjects but one" can exist, and taught instead the tyranny of a dominant delusion? This patient struggled against doing so terrible a deed even after his mind was made up as to its necessity. His struggle was unavailing. Twice he visited his guardian with the intention of doing him injury, but was deterred through cowardice. Finally his delusion obtained the mastery, and the impulse to remove a fancied enemy could no longer be resisted.

This is but one of many instances where persons regarded "harmlessly insane" have suddenly developed criminal instincts. Such exist in every community, are permitted to exercise the rights of citizenship, to marry and beget children. Is it strange that newspapers teem with accounts of homicide, arson, and outrage committed by this irresponsible class?

The preceding case illustrates a form of disease described by German writers under the name *primäre Verrücktheit*. This malady occurs in those of neurotic organization and originally feeble mental capacity; is in fact an expression of such defect.

These persons "grow up to be insane." The starting point of disease in the case of K. seems to have been the period of pubescence: it is, at all events, difficult to believe that his restlessness, tendency to wander, and inaptitude for learning, were not indicative of a morbid change in the nervous system at this important period of life. While the additional fact that he received an injury to the head at the age of sixteen should not be overlooked as possibly favouring mental degeneration.

In respect to the form of disease under consideration, Krafft-Ebing speaks as follows:—

“1. It is a form of disease found almost exclusively among those whose brains are encumbered (belastet), generally through hereditary taint.

“2. Delusions whose primary, primordial significance is evident through the absence of any emotional basis, or any reflection as to their origin, constitute the nucleus of the disease.

“3. The disease has a fixed deep constitutional character. It does not lead to the destruction of the psychical mechanism, to dementia, but rather leaves the apparatus of logical thought intact.”

The following comparison is made by the same author between the delusions of melancholia and those of primäre Verrücktheit. He says.—

“The insane ideas may here be substantially the same, but they originate differently. The monomaniac does not know how it happens that he is persecuted, he does not deserve it. Gradually and in a logical manner he arrives at the conclusion that he is the victim of a conspiracy. The sufferer from melancholia knows only too well why he is persecuted, he hastens to meet a shameful death. He deserves death for he is a bad fellow. These delusions are secondary products of emotional states. They proceed from and are grounded in a diminished self-respect.”

As many patients of the Verrücktheit class are addicted to the habit of masturbation, and present the characteristics of insanity from this vice, it seems important to inquire in what respect the two types of disease differ. I believe their main point of divergence to be an absence in the former class of the tendency to irritable dementia, which is so marked a characteristic of the insanity of masturbation. In the case of K. there is also a lack of the moral perversion which is so constantly associated with this form of disease.

It requires but a cursory review of the foregoing case to develop the points of resemblance it bears to that of Guiteau. Disregarding the moral traits of these two individuals, their cases are strikingly similar.

Each possessed a neurotic organization.

Each committed a sudden and premeditated homicidal act with an ostensible motive.

Each was deterred on two occasions from carrying a pre-formed plan for killing into execution.

Each took measures for personal safety after the commission of the crime.

Each laid claim to inspiration.

Each pleaded insanity, the one to escape punishment, the other to obtain a pension.

Both were intensely egotistic, had an exaggerated sense of their own importance, wrote profusely, and had followed unsuccessfully the profession of lecturing.

Both were visionary and expansive, and showed a lack of good business judgment.

Each became erratic and perverted at an early age.

In neither case were the higher mental faculties much below the normal standard for the individual; each reasoned logically though from false and inadequate premises.

Their points of dissimilarity arise almost wholly from the separate degrees of mental development which the individuals enjoyed, and the circumstances attending their education and training.

In contradiction of the oft-repeated assertion that the execution of an insane criminal now and then has a deterrent effect upon others of like propensities, the case of K. may well be cited, inasmuch as his homicidal assault was made less than five months after the hanging of the murderer of the President, and in face of the strong popular sentiment against the so-called "cranks" and lawless fanatics.

There are few more striking illustrations of the impotency of moral and legal measures to restrain or control a morbid impulse.

Since the preparation of the above manuscript certain revelations have been made by a fellow-patient respecting K.'s designs. It seems that becoming restive under detention he has contemplated effecting his release by taking the life of the superintendent of the asylum. He procured and concealed in his stocking a sharp-pointed steel husking-pin and laid a plan for the murder. Unless he was previously discharged this was to take place on or after the first day of April, at which time his conscience, to use his own expression, "would be clear." It was communicated to him several weeks before in a dream that the superintendent was conspiring with his guardian and the judge of probate to kill him, "box him up," and ship him to a medical college for dissection. It was further revealed that his removal was to be effected by poison. (This by the way explains a sudden and unaccountable disinclination which he recently exhibited toward taking medicine.) When interrogated as to whether he had a weapon concealed on his person he showed confusion and replied evasively. On the day following its discovery he admitted his design, and referred to the possible killing as an act of "self-defence." He showed no regret and did not appreciate the enormity of the contemplated crime, but was evidently mortified and humiliated at its discovery. He had observed, he said, that of late he had been scrutinized closely, and to avoid questioning had made every effort to seclude himself. He now concludes without inquiry, that his thoughts were revealed and his plot exposed through his tell-tale expression of countenance.

Could a more striking illustration be given of the danger of discharging such a man from the custody of an asylum?

At the trial of Guiteau, the following conversation with the prisoner was given in evidence: "You said if you got the consulship you would not have taken off the President." "That is so; but you see I have put in the *Herald* article that this would have made no difference." "I notice

that, but the two statements could not harmonize, and I see you use the word 'deter;' it would have deterred you." "That is true."

K. by his own admission would have abandoned the thought of killing the superintendent of the asylum had his discharge been effected prior to April 1.

ARTICLE VII.

REPORT OF EIGHT CASES OF COXALGIA IN WHICH ELEVEN OPERATIONS OF SUBCUTANEOUS OSTEOTOMY HAVE BEEN PERFORMED IN THE CHILDREN'S HOSPITAL, PHILADELPHIA. WITH REMARKS. By H. R. WHARTON, M.D., Surgeon to the Children's Hospital, Demonstrator of Clinical Surgery in the University of Pennsylvania, and Assistant Surgeon to the University Hospital.

THIS paper records eight cases of coxalgia followed by marked deformity, in which eleven subcutaneous osteotomies of the femur were performed. In Case I., under the care of Prof. Ashhurst, two operations were performed; the neck of the bone having been first divided after the manner of Mr. Adams, and the deformity recurring, the bone being subsequently divided below the lesser trochanter, as in the operation recommended by Mr. Gant. The same procedure was adopted in Case III., which was under the care of the late Dr. H. Lenox Hodge. Case II., also under the care of Prof. Ashhurst, was one in which the deformity existed in both hip-joints, and both femora were divided, a short time being allowed to intervene between the operations.

CASE I.—Livingstone E., aged 4 years, was admitted to the Children's Hospital October 10, 1874, with coxalgia of the right hip-joint in the second stage. During the course of the disease numerous abscesses had formed and had been evacuated, but the active symptoms of the disease finally subsided, leaving a completely useless limb on account of the resulting deformity, adduction and flexion of the thigh on the pelvis, and fixation of the coxo-femoral articulation.

On November 10, 1876, Prof. Ashhurst made a subcutaneous section of the neck of the femur after the plan devised by Mr. Adams, of London, and brought the affected limb into good position; the wound was closed with a compress, saturated with compound tincture of benzoin, held in position by adhesive straps, and an adhesive-plaster extension apparatus was then applied to the limb, to which a weight was attached, and lateral support was furnished to the limb by means of a long external and short internal sand-bag. The patient did well after the operation, and presented no unfavourable symptoms; but, as it was found that the deformity was gradually recurring, on April 10, 1877, Prof. Ashhurst deemed it advisable to divide the femur subcutaneously below the lesser trochanter; this was accordingly done after the method recommended by Mr. Gant, except that the bone was approached from the outer side instead of from behind, as appears to be Mr. Gant's practice.

The knife devised by Mr. Adams was used to divide the soft parts to the bone, and the section of the latter was made with Adams's saw.

The usual dressings were applied, and the result of the operation was perfectly satisfactory; the patient was discharged from the hospital August 4, 1877, walking well without the aid of crutches or high-shoe.

CASE II.—Maggie B., aged 8 years, was admitted to the Children's Hospital January 25, 1876, with ankylosis of both hips in bad position, having suffered from coxalgia two years before admission.

In September, 1876, Prof. Ashhurst divided the neck of the left femur subcutaneously, doing in this case the operation recommended by Mr. Adams; the patient did well after the operation, and, some weeks later, Prof. Ashhurst divided the right femur subcutaneously, after Gant's method, modified as in the preceding case.

The results of both operations were perfectly successful, and the patient was discharged from the hospital March 9, 1877, walking well with the aid of a high-shoe on the right foot.

CASE III.—Frank G., aged 7 years, was admitted to the Children's Hospital September 15, 1874, with coxalgia of left hip-joint in the second stage. The deformity following the disease being marked and rendering the limb useless, on November 10, 1876, Dr. Hodge divided the neck of the left femur subcutaneously (Adams's operation). The patient did well after the operation, but when he was allowed to get out of bed it was found that the deformity had in a measure recurred.

On July 12, 1877, Dr. Hodge made a subcutaneous section of the left femur below the lesser trochanter (Gant's operation). The patient did well after this operation, and was discharged from the hospital September 25, 1877, walking well.

CASE IV.—Maggie S. was admitted to the Children's Hospital with marked deformity of left coxo-femoral articulation following coxalgia.

On May 15, 1879, Dr. Hodge made a subcutaneous section of the left femur below the lesser trochanter; the limb was brought into good position, and the patient did well after the operation, and was discharged from the hospital August 18, 1879, walking well.

CASE V.—Benjamin C., aged eight years, was admitted to the Children's Hospital April 1, 1879, with marked deformity of the left coxo-femoral articulation following coxalgia of some years' standing.

On May 30th, Prof. Ashhurst divided subcutaneously the left femur below the lesser trochanter.

The patient did well after the operation, and was discharged from the hospital September 15, 1879, walking well.

CASE VI.—Mary P., aged 13 years, was admitted to the Children's Hospital with marked deformity of left coxo-femoral articulation, following coxalgia of some years' standing.

On November 26th, Dr. Ashhurst made a subcutaneous section of the left femur below the lesser trochanter.

The patient did well after the operation, and was discharged from the hospital February, 1880, walking well.

CASE VII.—Sarah B., aged 7 years, was admitted to the Children's Hospital June 12, 1880, with coxalgia of the left coxo-femoral articulation; the active symptoms of the disease passed away, leaving the left femur much adducted and flexed upon the pelvis.

On December 12, 1881, Dr. Wharton divided the left femur subcutaneously below the lesser trochanter. The limb was brought into good

position, the usual dressings were applied, and the patient did well after the operation.

This patient was discharged from the hospital three months after the operation, with the limb in good position and walking well.

CASE VIII.—James McC., aged 9 years, was admitted to the Children's Hospital July 31, 1882, with coxalgia of the right coxo-femoral articulation in the third stage, with marked adduction and flexion of the thigh on the pelvis. Efforts were made to correct the deformity by extension, which proved unavailing.

On November 25, 1882, all active symptoms of the disease having subsided, and the deformity being so marked as to render the limb useless, Dr. Wharton made a subcutaneous section of the right femur below the lesser trochanter, which allowed the limb to be brought down into good position; the usual dressings were applied, the patient did well after the operation, and, in March, 1883, was walking about the ward with the aid of a high shoe.

The results obtained by the subcutaneous section of the femur in the above cases were most satisfactory, not only as regards the immunity from danger in the operation, but also as regards the correction of the deformities and restoration to use, of comparatively useless limbs.

The amount of constitutional disturbance following the operations was insignificant, as little, or even less, than that which follows a simple fracture of the femur; in no case was there excessive hemorrhage at the time of operation, nor did there follow in any case marked febrile reaction or suppuration; the wounds healed as ordinary tenotomy wounds, and by the end of the first week were generally found entirely closed, so that further dressings could be dispensed with.

In several of the cases there was some oozing of blood-stained serum from the wound for two or three days, but it was not profuse enough to necessitate the removal of the dressings.

The facility with which the wounds healed in these cases can only be explained by their subcutaneous character, for although by the operation a compound fracture of the femur is produced, it must be remembered that the original puncture, which is made down to the bone by Mr. Adams's knife, is small, and that when the saw is introduced and cuts the bone, the wound is entirely filled by its shank, by blood and by dust from the sawn bone, so preventing the admission of air to the deeper parts of the wound.

The mortality following the operation is very low; Mr. Adams¹ reports twenty-four cases in which this operation was performed, with one death from pyæmia; in one other case death was hastened by the operation, or rather by the prolonged suppuration which followed; the patient died eight months afterwards from albuminuria and phthisis. In but one case have I seen marked constitutional disturbance occur after this operation,

¹ Transactions of International Medical Congress, Philada. 1876, p. 627.

and that was in the case of a young man of strumous constitution, a patient in one of our large hospitals, in whom the neck of the femur was divided subcutaneously for angular deformity following coxalgia. The operation in this case was followed by the formation of a diffuse abscess of the thigh, which required numerous counter-openings, and placed the patient's life for a time in imminent danger; this case finally terminated in recovery with the limb in good position.

The results of reported cases bear strong testimony to the general safety of the operation, and there is no doubt that the selection of proper cases, and care as to the position at which the section of the bone is made, will render this operation one of the safest in surgery.

In regard to the selection of cases, Mr. Adams considers as most favourable for division of the *neck of the bone*: (1) Cases of rheumatic ankylosis, because in rheumatism no destruction of the bone ever exists, and the head and neck of the bone always remain of their full natural size. (2) Cases of ankylosis after pyæmic inflammation, most especially in its subacute form, from which the patient often recovers; in these cases destruction of the bone rarely if ever exists, the cartilages only being more or less destroyed. (3) Cases of ankylosis after traumatic inflammation of the joints, in which little or no destruction of the bone occurs. (4) The most unfavourable cases for Mr. Adams's operation are those which occur in strumous subjects, where destruction of the head and neck of the femur has taken place. This latter class of cases is one in which the indication for the operation most frequently exists; the deformity following coxalgia, unless corrected, often leaves the patient to go through life a hopeless cripple, and I cannot but think that the satisfactory results obtained in cases of this nature, by division of the bone by Gant's modification of Mr. Adams's method, will lead to the more general adoption of an operation which is attended with little risk, and which offers so much for the relief of this distressing condition.

The operation may be performed with the narrow knife and saw devised by Mr. Adams, which I think have proved most satisfactory instruments, or a chisel and mallet may be used, as recommended by Mr. Maunder, of London; Macewen's osteotomes have also been used with success.

The latter instruments were used in a most interesting case of angular ankylosis of both hips following coxalgia, in which a simultaneous osteotomy was successfully performed by Dr. Joseph C. Hutelison, of Brooklyn.¹

The use of Adams's saw seems to me to possess the advantage of rendering the operation more nearly subcutaneous, and the instrument to be more directly under the control of the operator than the chisel struck by the mallet, and, therefore, less likely to be followed by injury of important surrounding structures.

¹ American Journal of the Medical Sciences, April, 1883.

The only cases where the substitution of the chisel for the saw appears to present advantages are those where a great thickness of bone, as in the head of the tibia, or the condyles of the femur are to be divided; here the great width of the bones, their subcutaneous position, and the small extent of cutting surface of the saw, seem to render the use of the chisel advisable.

As regards the point at which the section of the bone should be made some difference of opinion exists; Mr. Adams, to whom the introduction of this operation is due, recommended that the section should be made through the neck of the femur, entering the knife a little above the top of the great trochanter, and introducing the saw through the same wound; and there is little doubt that this operation possesses many advantages in properly selected cases.

But from the fact that subcutaneous osteotomy is frequently required to correct the deformity after coxalgia, where great destruction of the head and neck of the femur has taken place, the modification of the operation suggested by Mr. Gant, is often to be preferred. It consists in dividing the shaft of the femur subcutaneously just below the position of the smaller trochanter, and for its performance instruments similar to those used by Mr. Adams are required.

Section of the femur at this point, below the lesser trochanter, secures a division of the bone at a point where its structure is comparatively healthy, whereas its division through the diseased tissues of its neck, if this still exists, is capable of renewing active inflammation in tissues which are most susceptible to the inflammatory accidents following traumas. Section of the femur below the lesser trochanter, in addition to the other advantages previously mentioned, has in our hands, at the Children's Hospital, given better results in correcting the deformity, and in lessening the chances of its recurrence; this can be seen by reference to Cases I. and III., where both operations were performed, and the latter in each case gave a most satisfactory result, while the former—division of the neck of the bone—had been followed by reproduction of the deformity.

This may be explained by the fact that the deformity in these cases is caused by contraction of the *psoas magnus* and *iliacus internus* muscles. These muscles being inserted into the lesser trochanter and the shaft of the femur below it, remain, after section of the neck of the femur, attached to the lower portion of the bone, and hold the thigh in a flexed position as before.

When the section is made below the lesser trochanter, the *psoas* and *iliacus* muscles remain attached to the upper fragment, and do not, therefore, interfere with the straightening of the thigh as they can no longer influence the shaft of the bone.

There is also an advantage in making the section as near the lower trochanter as possible, for, if the upper fragment be short, the angle made

at the point of union is less perceptible and the limb has a more natural appearance. In making the section below the lesser trochanter, we have found it best to insert the knife and saw on the outer and posterior portion of the thigh, and to divide the bone from before backwards; with care there can be no risk of injuring either the femoral vessels and anterior crural nerve on the inner side, or the great sciatic nerve behind.

ARTICLE VIII.

ON NASAL COUGH, AND THE EXISTENCE OF A SENSITIVE REFLEX AREA IN THE NOSE.¹ By JOHN N. MACKENZIE, M.D., of Baltimore, Md., Surgeon to the Baltimore Eye, Ear, and Throat Charity Hospital.

THE object of this communication is to direct attention to the *great frequency of cough as a symptom of nasal disease*, and to indicate, as far as possible, the manner of its production.

The dependence of cough upon irritation of the external auditory meatus and pharyngo-tracheal membrane is well known, and the terms "ear" and "laryngeal" cough have passed into current use among medical men. It is also quite possible that the reflex act may originate primarily in morbid conditions of various other organs of the body, and the familiar expressions "stomach" and "liver" cough would seem to indicate that such a causal connection had been accepted as true of some of the abdominal viscera. This interdependence has, however, never been demonstrated by experiment, nor are the clinical data sufficient to warrant the unqualified acceptance of this alleged correlation.

My attention was first directed to the study of nose cough by the repeated observation, that, during the manipulation of instruments (probe, forceps, snare, Eustachian catheter, etc.) within the nasal fossæ, paroxysms of coughing were induced which only subsided upon the withdrawal of the instrument, or upon changing its position in the nasal chamber. The cough varied greatly in character, from a succession of short expiratory acts to convulsive paroxysms which interfered greatly with instrumentation. These attacks occurred, furthermore, only when the foreign body came in contact with the deeper portions of the nostril; in several cases where the snare was used they seemed to be excited only at one particular spot in its passage through the nose, and ceased when the loop entered the naso-pharynx. My clinical experience, too, furnished me with cases where distressing cough existed, whose etiology was rendered obscure by the absence of disease or irritation in pharynx, windpipe, or lungs. In

¹ Presented as a candidate's thesis to the Maryland Academy of Medicine, May 12, 1883.

this latter case, one of two conditions was invariably present, viz., either a hyperæmie or slightly swollen state, of the mucous membrane chiefly affecting the turbinated bodies, or pronounced hypertrophic enlargement of these structures.

It was in the clinical study of this reflex cough that I was led to assume the existence of a certain area or areas in the nose, the irritation of which would culminate in a reflex act or in a series of reflected phenomena. The existence of such an area had been demonstrated in the larynx and trachea, and it seemed, therefore, legitimate to assume the presence of similar spots in the nasal chamber. The well-known occurrence of reflex asthmatic attacks in some cases of nasal polypus and their absence in others, together with similar observations which I had made in regard to hypertrophic nasal catarrh, lent further support to the hypothesis of a reflex area.

In order, if possible, to throw some light upon this subject, I made a series of experiments upon a large number of hospital patients, upon myself, and upon several of my medical friends, who were kind enough to place their nasal organs at the disposal of science. The experiments consisted essentially in the systematic irritation of all accessible portions of the nasal mucous membrane, the irritants used being silver and rubber probes and the steel wire, such as used in the polyp-snare.

It may be here remarked, that the nose of the negro is admirably adapted for experiment on account of the great capacity of the nasal chambers anteriorly, rendering dilatation by artificial means unnecessary, and hence eliminating a source of error which might vitiate the result of the experiment. The great width of the vestibule, too, brings the anterior ends of the turbinated bones into greater prominence, or rather, their mucous covering, which, in the black race, is much more puffy anteriorly than in the white man, giving the appearance of what in the latter would be taken for an anterior hypertrophy. It is also very flabby, collapses under the probe, and can be pressed with ease against the external wall of the nostril.

The patients experimented on presented varying degrees of susceptibility to irritation; in some instances, the slightest touch was sufficient to provoke the reflex act, whilst in others it was only excited by repeated irritation or long-continued pressure. In some cases no reflex whatever could be obtained. The results of these experiments may be briefly given as follows:—

So long as the stimulation was confined to the vestibule—to the interior of the fleshy, cartilaginous nose—the result was negative; no reflex action was obtained. The sensation created was simply that of a foreign body, or, if the stimulus was increased, a feeling of pain. So far, I have been unable to excite cough by stimulation of this part of the nose. Irritation of the membrane clothing the anterior extremities of the middle and infe-

rior turbinated bones was in some instances negative; in others a half-tendency to cough was produced which increased as the irritant was applied farther back, and finally culminated in the act when it was directed upon the posterior half of the turbinated body. Irritation of the floor of the nose was negative in result. In cases where stimulation of the remaining portions of the nose failed to excite them, paroxysms of cough were induced when the irritant was applied to the mucous membrane covering both the inferior and middle turbinated bones; but the act was most constantly obtained from the posterior end of the inferior turbinated bone and the portion of the septum immediately opposite. Indeed, my experiments seem, thus far, to show that these portions are the most sensitive spots in the reflex area. In passing along the pars nasalis of the roof, coughing was occasionally produced when the probe or wire impinged on the anterior extremity of the middle turbinated bone; but no decided results could be obtained from the upper olfactory region.

We have thus experimental proof that all parts of the nasal mucous membrane are not equally susceptible to the impression by which reflex cough is produced, and, furthermore, that the cough or reflex area is probably limited to the mucous membrane covering the middle and inferior turbinated bodies and the posterior half of the septum. Now this is the area occupied by the erectile tissue of the nose, and it is hard to resist the conclusion, that this structure is in some way connected with the evolution of the reflex act, and that the peculiar susceptibility to irritation is to a great extent intimately associated with its physiological functions, whatever they may be.

Roughly speaking, the greater the congestion or inflammation, the more constant the reflex obtained. I have succeeded, however, in producing violent paroxysms of laryngeal cough by simply touching, with the aid of the rhinoscope, the posterior extremity of the inferior turbinated bone in a person whose nose was free from disease. In some cases, stoppage of the nostril and discharge of mucus was produced, whilst in others this was not observed.

That the sensitive area is principally confined to the parts already indicated, viz., the posterior half of the inferior turbinated body and septum, is furthermore rendered exceedingly probable by the following clinical facts:—

- (1) That in cases where reflex cough exists, these are the portions chiefly, if not solely, involved.
- (2) That the act may be produced here at will by artificial stimulation of the parts invaded by the morbid process.
- (3) That it may be dissipated by local applications to, or removal of, the membrane covering the diseased surface.

- (4) That foreign bodies, such as pins, lodging in this area sometimes give rise to cough, which latter is not observed when they become impacted in other portions of the nose.
- (5) That polypi give rise to reflex phenomena only when they arise from, or impinge upon, the sensitive portions of the area.
- (6) That where complete atrophy of the turbinated structures exists, as, for example, in ozena, reflex cough is not present, nor can it be induced by artificial stimulation.

These facts are the outcome of personal experience, and, as they represent the result of solitary observation, are, of course, open to correction. I have never seen, nor do I know of a single case where a foreign substance impacted in the non-sensitive portions of the nose has given rise to cough; but I do know of cases where that act was excited by their presence in the reflex area. In regard to *reflex asthma* from polypi, the literature accessible to me shows, that, where the position of the tumour is accurately defined by the reporter, it is always in the posterior portions of the nostril, in a situation which would lead to irritation of the sensitive tract.

The following cases may be adduced as illustrative of the above remarks:—

CASE I. Miss S., a robust, healthy young woman of fine physique, but of somewhat nervous temperament, came in December, 1881, at the solicitation of her friends, to consult me on account of a dry, hacking cough, dyspnoea on slight exertion, and occasional night sweats. The association of this suspicious triad of symptoms, with feverish exacerbations in the afternoon, loss of appetite, irregular, scanty menstruation, the occasional presence of small quantities of blood in the expectoration, and progressive deafness, had led her family to anticipate medical opinion in the matter, and to refer her ailments to consumption.

Beyond a few small mucous râles, nothing abnormal was discovered in the lungs, and the heart performed its work in a perfectly natural manner. The laryngeal membrane showed no signs of inflammation, but during the examination became congested. Both tympanic membranes were sunken, but movable; the malleus handle prominent and congested. Ordinary conversation was heard with difficulty; improved by inflation of the drum cavity. The orifices of the Eustachian tubes were swollen and filled with mucus.

The starting-point of all her trouble was finally discovered in the nose, which was almost completely occluded by hypertrophic thickening of the mucous membrane over the middle and lower turbinated bones of both sides. The osseous structure was also developed to an abnormal extent, and assisted in the occlusion of the nostrils. I explained the situation to the patient, and assured her that an operation would certainly relieve, and perhaps completely dissipate, the disorders from which she suffered. This she consented to, and the inferior hypertrophied masses were removed—seven days intervening between the two operations. Vapour of creasote, carbolyzed and astringent sprays, inflation of the middle ear with the vapour of the benzoate of iodine constituted the remainder of the treatment. Im-

provement at once began, and in seven days after the second operation all symptoms referable to the chest had disappeared, and the discharge from the nose had ceased to trouble her. Two weeks later she could hear ordinary conversation with ease, and by the middle of the following February the whispered voice was heard distinctly in each ear at the distance of twenty feet.

CASE II. A negro man came to my clinic at the hospital to be treated for a severe paroxysmal cough which occurred at irregular intervals, and which, together with the occasional expectoration of small quantities of mucus tinged with blood, had led him to infer the existence of some pulmonary affection. The attacks came on both in the night and during the daytime, and seemed, according to his story, to vary in severity with the amount of a discharge from a nasal catarrh from which he had suffered for a number of months. His general health was excellent, and beyond a very slightly hyperæmic condition of the ventricular bands and vocal cords, nothing could be detected in the lower respiratory organs to warrant the diagnosis of disease. The pathological appearances in the nose and upper pharynx were those of ordinary hypertrophic catarrh, affecting chiefly the inferior and middle turbinated structures and the septum, the mucous membrane over the inferior turbinated body being moderately swollen and intensely hyperæmic. A bent probe was introduced, with the aid of the mirror, behind the velum, and made to impinge on the posterior end of the lower turbinated bone. Immediately a violent paroxysm of coughing was induced, which he assured me was identical with those from which he suffered. At no other portion of the nasal membrane could the attacks be provoked. The experiment was performed repeatedly, and always with the same result. Looking upon the paroxysm as a purely reflex phenomenon, the treatment was confined to the local application of astringent solutions to the congested, swollen area. The patient was directed to use a salt and soda spray at home, followed by the insufflation of finely powdered boracic acid. No other treatment was used. After the third application the coughing-spells became less severe, and the interval between them more prolonged; at the end of two weeks they had completely disappeared, together with the hyperæmia and swelling of the mucous membrane over the inferior turbinated bones. The nasal discharge had diminished to such an extent that the patient, finding no further inconvenience from his catarrh, ceased attendance at the clinic.

CASE III. A young girl, of healthy appearance and good physique, consulted me on account of a short, dry, hacking cough, with which she had been troubled for several weeks. The cough was most severe when she laid down to rest at night. She also complained of slight sore-throat and difficulty in swallowing. She insisted that her nose had never given her the slightest inconvenience, and that, strange to say, she very rarely suffered from coryza. The lower respiratory passages presented no signs of disease; but the left tonsil was the seat of chronic follicular inflammation; the follicles were swollen and filled with cheesy deposits; the gland itself was slightly enlarged. I removed the diseased tonsil, and dismissed her, deferring the examination of the nose until her next visit, as she had denied disease of that organ, and as I was anxious to get through my work that day as quickly as possible. Moreover, I thought that the diseased tonsil might possibly be the originator of the reflex cough, and that its ablation would effect a cure.

Several days afterwards she returned to say that her sore-throat had

disappeared, and that she could swallow with perfect ease; but that her cough still remained, in fact seemed to have increased somewhat in severity. A thorough examination of the nose was now made. Nothing abnormal was detected in either side, except a hyperæmic and very puffy condition of the membrane covering the inferior turbinated bone of the left nostril. Upon touching this lightly with a silver probe, the short, explosive cough of which she complained was at once produced. The act was completely beyond her control, and could be excited only by irritation of the turbinated structure. As the swelling was obviously due to a more or less acute engorgement of the turbinated tissues, and not to chronic inflammation of the same, the treatment consisted in the topical application to the diseased surface alone of sedative and astringent remedies. Four or five pencillings caused the cough and swelling to disappear; to return, however, when the local applications were discontinued. Upon their resumption, the cough began to grow less severe, and finally ceased altogether. As she has not returned for further treatment, it may be assumed that the cure has been permanent.

CASE IV. A gentleman whom I had treated six months previously for catarrhal laryngitis, consulted me on account of a disagreeable, hacking cough, and pain in the throat, which he referred to the region of the cricothyroid space. The sensation complained of was that of a foreign body in the larynx, and was not constant, disappearing sometimes for hours at a time. There was no expectoration with the cough; but he remarked incidentally, that for some time past he had noticed an accumulation of mucus in the nose and back of the throat, and that his voice became easily fatigued in singing. It was especially after such exercise of the voice that the tickling in the larynx and paroxysms of cough were produced. Before coming to my office he had used a stimulating inhalation which I had prescribed for him the winter before, and from which he had then derived considerable benefit. On this occasion, however, it had failed to exert any influence upon the cough. As I could discover nothing in the larynx or lungs to account for the symptoms which he described, and as inspection and probing of the anterior portions of the nose revealed nothing abnormal, I had begun to suspect that the phenomena might be ascribed to a somewhat exalted imagination, when the rhinoscope revealed the origin of his trouble in a swollen, intensely hyperæmic condition of the inferior turbinated bodies. These latter were covered with a film of mucus, which extended also over the pharyngeal vault. This was carefully removed, and the reddened turbinated body lightly touched with a bent probe. Pain was at once felt in the larynx, which caused him to grasp the throat with his hand. This was immediately succeeded by a paroxysm of coughing which lasted for nearly a minute. The sensation of pain and cough produced by touching the inflamed turbinated structures was compared by him to an aggravation of his existing complaint, the pain being slightly more pronounced in the former case, and radiating into the lower part of the trachea. Local treatment of the diseased nasal mucous membrane was at once instituted with marked relief to the symptoms.

CASE V. A well-known physician of this city had suffered for over twenty years from chronic sore-throat, for which he had undergone every variety of treatment. His case, apart from a feature to be presently mentioned, presented nothing out of the ordinary run of similar cases of old catarrhal disease of the upper respiratory tract. He referred all his trouble to the larynx and pharynx, and when questioned as to the existence

of nasal disease, seemed convinced that such a condition played no part whatsoever in the production of his laryngeal catarrh. Upon retiring at night and turning upon his left side, as was his wont, he was seized with involuntary and uncontrollable paroxysms of coughing, which only subsided when he laid upon the opposite side. He also complained of a sensation, as of a heavy weight in the back of the throat, which became more pronounced toward morning. This state of affairs had lasted for a number of years, and had become a source of great annoyance to him, as he could not explain the curious relationship between cough and position, nor could those of his medical friends whom he consulted on the subject, enlighten him as to the etiology of the paroxysms. His throat had been treated after the most orthodox manner, and his epiglottis had been cauterized under the impression that its inflamed condition was the starting point of the cough. These means, had, however, proved of no avail, and he had finally accepted the cough, with philosophic resolution, as the inseparable associate of his life. Recently, however, the paroxysms had become more severe and annoying, and one day he called on me for a professional opinion.

The mucous membrane of the entire naso-laryngeal tract presented the ordinary typical appearances of chronic catarrhal inflammation of these organs. The pharynx was granular and irritable. The posterior extremity of the right inferior turbinated bone was the seat of a small grayish-white hypertrophy which had not, however, encroached to any great extent upon the lumen of the corresponding inferior meatus. The middle and superior turbinated bodies of the same side were moderately swollen and very hyperæmic. There was also a moderate amount of hypertrophic enlargement on either side of the posterior half of the septum. A similar condition existed on the middle and superior turbinated bodies of the opposite side. There was no anterior hypertrophy of any of the turbinated structures; but the posterior part of the left inferior meatus was completely blocked by a large, irregularly oval, vascular hypertrophy of the posterior extremity of the inferior turbinated body of that side. This, I assured him, was the *fons et origo* of all his trouble, and the inflammation of the pharyngo-laryngeal tract was secondary to a chronic hypertrophic nasal catarrh; that the cough was reflex in character, and depended upon the hypertrophic enlargement of the posterior end of the left inferior turbinated body, an area which was especially concerned in the evolution of reflex phenomena. I furthermore gave it as my opinion, that the removal of the hypertrophied mass would, in all probability, dissipate the cough, and proposed an operation then and there. This he refused, and I treated him under protest for several days with an astringent and alterative spray. As no effect was produced upon the cough by this treatment, he consented at last to the operation. The hypertrophy of the left turbinated body—a growth about the size of a small strawberry—was accordingly removed with ease by means of the snare, the wound allowed to bleed for some time to encourage evacuation of the erectile cells, and the nostril finally plugged with carbolized absorbent cotton.

The effect was almost magical. The next day he came to tell me that he had not coughed one-sixteenth as much as before the operation, and that if he remained in his then condition, he would be perfectly satisfied with the result. A few days later, when cicatrization was complete, the cough had almost entirely disappeared, in fact, was hardly noticeable, and he could lie upon the left side with perfect comfort and freedom from cough, a pleasure he had not experienced for many years.

CASE VI. A middle-aged gentleman placed himself under my care to be treated, as he supposed, for chronic bronchitis. He had for a number of years been subject to attacks of influenza, the disease always starting as an acute coryza and ending in a bronchial catarrh. He volunteered the information, that the cough was always most severe and harassing when the inflammatory process was confined to the nose, and abated considerably when it descended to the lower portions of the respiratory tract. The intervals between the attacks had gradually become less and less, so that the cough was almost constantly present. It was short, hacking, and unaccompanied by expectoration. In bodily operations requiring unusual exertion, he was compelled to breathe exclusively through the mouth, and became very readily fatigued. Even in walking a great distance, or in going up stairs, the dyspnoea was sufficient to give him considerable anxiety. He had consulted a specialist, who informed him that all his trouble arose from inflammation of the windpipe and bronchial tubes, and who treated him for a number of months with laryngeal sprays, stimulant inhalations, etc. No effect was produced upon the cough, which continued, in spite of treatment, with all its original severity.

On careful auscultation, a few mucous râles were discovered here and there in the chest, in not sufficient number, however, to warrant the diagnosis of chronic bronchitis. The larynx was congested. The mucous membrane lining the posterior nares was intensely hyperæmic; the inferior turbinated bone of each side swollen and hypertrophied. Well-marked hypertrophic enlargement of the cavernous tissue of the septum was also present, especially on the right side, which, together with the inferior hypertrophy, produced almost complete occlusion of the inferior meatus of the corresponding nostril. Anteriorly, the nasal fossæ presented nothing worthy of special remark. Under the assumption that the inflammatory engorgement of the turbinated structures was the most important, if not the sole factor in the production of the cough, the treatment was directed to the local nasal affection. He was given a carbolyzed alkaline spray for use at home, and a tar vapour to inhale through the nostrils. The nasal cavities being thoroughly cleansed, local applications of ammonio-ferrie alum and zinc were made to the diseased turbinated bodies. At first the applications themselves gave rise to cough; but this tendency grew less as the congestion of the membrane began to disappear. With its subsidence the patient commenced to improve, and the cough ceased to give him inconvenience. As long as the local treatment was continued, there was a marked diminution in the number and severity of the cough paroxysms. Upon its discontinuance, both the cough and congestion reappeared. As he has never been willing to submit to an operation, I am still holding his cough in abeyance by local applications.

CASE VII. The winter before last a gentleman came to my office to have his chest examined. His history was briefly as follows: For nearly two years he had suffered almost uninterruptedly from a distressing, hacking cough, which was most severe in the early morning and when he laid down to rest at night. He was extremely subject to cold in the head, and during inclement weather his voice would become hoarse and remain so for days at a time. For six months prior to seeking advice he had been growing gradually deaf, and had begun to suffer from tinnitus aurium. At first he paid no attention to the cough; but it had finally become so harassing that he had temporarily given up his business and gone abroad. Very little benefit was derived from his European trip, and he returned home in

much the same condition in which he had left. Travel in the West was next tried, but without any effect upon the cough, which had increased rather than diminished in severity.

A careful examination of the internal organs disclosed nothing abnormal. The pharynx was congested, and its follicles somewhat swollen; but otherwise its mucous membrane presented nothing worthy of remark. During the laryngoscopic examination the partially injected laryngeal membrane became covered with a crimson blush, which faded slowly when the mirror was withdrawn. On rhinoscopic examination, the posterior ends of the inferior turbinated bodies were found greatly hypertrophied, especially that of the left side, which lay across the floor of the nostril, and almost completely precluded the passage of air through the meatus. The mucous membrane of the middle turbinated bodies and septum was reddened and turgid, the engorged condition being more pronounced in the posterior portions of the nose. The mouths of the Eustachian tubes were swollen, reddened, and filled with slimy mucus. Both drum cavities were the seat of catarrhal inflammation.

The sequence of events here was sufficiently obvious. As the patient, however, was loath to undergo an operation, it was determined to defer instrumental interference until less radical measures had been fairly tried. He was accordingly treated with sprays, inhalations, inflation, tonics, etc. In the course of a month marked improvement had taken place; the cough was much less severe, and the hearing notably improved. Upon the slightest change in the weather, however, the symptoms would recur. Especially noticeable was the sudden laryngeal congestion which would occur during the aggravation of the nasal inflammation, and which would immediately disappear when the latter was brought under subjection. This alternate subsidence and reappearance of the cough continued until the early part of last February, when he adopted my view of his case, and consented to the removal of the hypertrophied structures. In a few days after their ablation the cough had entirely disappeared. Shortly afterwards he went South on a pleasure trip, taking with him an array of medicines for use in case of a return of his original trouble. Fortunately he has had no occasion to resort to them; and he tells me that since the operation he has had no return of the cough, and that apart from the occasional accumulation of mucus in the pharynx, requiring hawking efforts for its removal, he is perfectly comfortable, and considers himself thoroughly cured.

These cases can be multiplied. Indeed, nasal cough has become so common in my experience, that I have long since ceased to regard it as a curiosity. It is worthy of remark, that in a fair proportion of cases there are few, if any, symptoms which would direct the attention to disease of the nose, and this fact emphasizes the importance of examining the nasal chambers in all cases of the kind, even though the testimony of the patient may lead to neglect of their systematic exploration.

My clinical observation leads me to the belief that reflected irritation from nasal disease plays a not inconspicuous part in the etiology of laryngeal congestion and inflammation. The short, hacking cough and hyperæmia of the larynx which occur in acute coryza are probably more often explicable on the theory of reflex action than upon the extension of the

inflammation to the laryngeal vestibule. The physiological explanation of this phenomenon may possibly be found in the doctrine of correlated areas,¹ the reflex taking place through the vaso-dilator nerves from the superior cervical ganglion of the sympathetic. In chronic coryza, on the other hand, the constant laryngeal hyperæmia induced by reflex nasal irritation, augmented, perhaps, by the frequent occurrence of cough paroxysms, may, if prolonged, eventuate in catarrhal conditions of that organ. In other words, on theoretical grounds, and clinical observation would seem to sustain them, it is legitimate to assume the existence of a *reflex laryngitis* evoked through the constant irritation of the vaso-motor centres from chronic nasal inflammation.

Clinical and experimental investigation would appear, then, to lead to the following conclusions:—

- (1) That in the nose there exists a definite, well-defined sensitive area, whose stimulation, either through a local pathological process, or through the action of an irritant introduced from without, is capable of producing an excitation, which finds its expression in a reflex act, or in a series of reflected phenomena.
- (2) That this sensitive area corresponds, in all probability, with that portion of the nasal mucous membrane which covers the turbinated corpora cavernosa.
- (3) That reflex cough is produced only by stimulation of this area, and is only exceptionally evoked when the irritant is applied to other portions of the nasal mucous membrane.
- (4) That all parts of this area are not equally capable of generating the reflex act, the most sensitive spot being probably represented by that portion of the membrane which clothes the posterior extremities of the inferior turbinated body and that of the septum immediately opposite.
- (5) That the tendency to reflex action varies in different individuals, and is probably dependent upon the varying degree of excitability of the erectile tissue. In some, the slightest touch is sufficient to excite it, in others, chronic hyperæmia or hypertrophy of the cavernous bodies seems to evoke it by constant irritation of the reflex centres, as occurs in similar conditions of other erectile organs, as, for example, the clitoris.
- (6) That this exaggerated or disordered functional activity of the area may possibly throw some light on the physiological destiny of the erectile bodies. Among other properties which they possess, may they not act as sentinels to guard the lower air-passages and pharynx against the entrance of foreign bodies, noxious exhalations, and other injurious agents to which they might otherwise be exposed?

¹ Comp. Woakes, Deafness, Giddiness, and Noises in the Head, Lond., 1880, p. 74 *et seq.*, on the Mechanism of Ear-cough.

Apart from their physiological interest, the practical importance of the above facts in a diagnostic and therapeutie point of view is sufficiently obvious. Therein lies the explanation of many obscure cases of cough which heretofore have received no satisfactory solution, and their recognition is the key to their successful treatment.

NOTE.—The following are the only references to the subject of nose-cough that I can find in the literature accessible to me. Dr. Hack, in the *Berliner klinische Wochenschrift*, No. 25, 1882, S. 381, relates a case where paroxysms of spasmodic cough, induced by a fibrous polyp which sprang from the right middle turbinated bone, were dissipated by removal of the growth. He regards the case as unique, but adds, that in the course of some physiological experiments on the normal nasal membrane, he had, in a small proportion of cases, noticed convulsive motions of the laryngeal adductors, which sometimes amounted to complete closure of the glottis, followed by an explosive cough-like sound, and suggests that this may also happen under pathological conditions of the nasal membrane.

In the *Archives of Laryngology*, vol. iii. No. 3, p. 240, 1882, Dr. Seiler reports two cases. In one, severe spasmodic cough, accompanied by a peculiar grunting or barking noise, was dependent upon a deflected septum and a large anterior turbinated hypertrophy; in the other, an excoriation of the mucous membrane of the septum gave rise to reflex cough, which was relieved by treatment of the nasal affection. Dr. S. observes, that he has not found a single instance in which the irritation causing reflex cough was seated in the nasal membrane. He seems, furthermore, to regard the direct irritation of the inter-arytenoid fold (laryngeal cough centre) by mucus dropping from the post-nasal space, as an important factor in the production of the cough in the two cases described. It is quite certain that cough may be, and is, often produced in the manner suggested; but in that case it obviously cannot be regarded as nasal, i. e., due to an irritation originating in the mucous membrane of the nose.

ARTICLE IX.

TWO CASES OF "PAGET'S DISEASE OF THE NIPPLE." By LOUIS A. DUHRING, M.D., Prof. of Skin Diseases in the University of Pennsylvania.

Two well-marked typical examples of this rare disease have within the year come under my observation. The notes are of interest, as showing the natural course of the process and the obstinacy of the lesions to treatment. I shall not at the present time enter upon discussion as to the nature of the disease, nor shall I refer to the views or the labours of other observers on the subject, beyond the mere statement that attention was first directed to the disease by Sir James Paget, in 1874, and that since cases have been reported by Munro, Lawson, Napier, Butlin, Henry Morris, and others. It may also be stated, that particular study has been bestowed upon the disease by Thin, especially with regard to its nature, who has proposed to term it "malignant papillary dermatitis." The disease has received but little notice outside of Great Britain. In this country but few cases are on record. By the majority of practitioners it is

regarded as "chronic eczema of the nipple," and, indeed, most of the reported cases bear this heading, accompanied, perhaps, by an interrogation mark. That it is not an eczema, but that it is a peculiar disease with a malignant tendency, the following cases will show.

CASE I. Mrs. L—, aged 65, spare, and in average health, was sent to me by Dr. J. D. Strawbridge, of Danville, Pa., on March 23, 1882, for advice and treatment concerning a chronic, obstinate disease of the right nipple, areola, and breast, of an eczematous nature. The lady, who was intelligent, gave this account of the disease. It began ten years ago in the centre of the nipple in the form of a "roughness" with slight scaling. This continued for a period of six months, with at times slight oozing and crusting, without, however, fissuring or becoming excoriated. It was treated with "caustics" for the next six months, at the end of which time the whole nipple was destroyed, as a result either of the disease or of treatment. From this date to the present time, a period of nine years, it has been gradually spreading, at first over the areola, then in the course of a few years over the central portion of the breast, the disease being apparently superficial, and of a chronic inflammatory nature, but little different in its general character from eczema of this region. It has been accompanied by a variable amount of oozing, excoriation and crusting, and with almost constant itching, which of late has been excessive. The itching was comparatively slight during the first five years, but for the last two or three years it has been severe and constant. Within the last two years, moreover, the region of the nipple has become sunken, puckered, and ulcerated, while the whole breast has enlarged and has become fuller and firmer. At times it has felt tender and sore. No lumps or nodules, however, have at any time been felt. The lymphatic glands have never been affected. The treatment had, at intervals during the ten years, been vigorously pushed on the part of several physicians, the remedies used having been numerous and varied, including tar, chloral, carbolic acid, and iodoform; internally, arsenic was repeatedly prescribed, but the system never tolerated its use. There is no history of any similar disease, nor of cancer, in the family.

The following notes were recorded at the first examination: The disease occupies the central portion of the breast, and consists of an irregularly shaped, somewhat circular, sharply defined, chronically-inflamed patch, about two and a half inches in diameter, somewhat excoriated, slightly crusted, and scaly. The colour is a bright crimson red, and is much more vivid than that usually met with in eczema. In the central part of the lesion it is intense. It is less marked as the periphery is approached. The nipple has disappeared, its site being sunken and the seat of an irregularly rounded ulcer a half inch in diameter and a quarter inch in depth, with a granular, violaceous red base. The secretion is scanty. The areola, too, has gone. The patch is smooth and firm, and is considerably thickened, the border being well defined and slightly elevated. The amount of discharge from the lesion is slight. The subjective symptoms consist of pain and itching. At times (more frequently during the last year) slight darting pains through the breast are experienced. Itching is constantly present, and is very annoying. In the opinion of the patient, this is the most distressing symptom of the disease.

The patient was placed upon an ointment of pyrogallic acid, consisting of a drachm and a half of the acid, five drachms of resin cerate, and two

drachms of lard. A week afterwards an extensive blackish crust had formed, which was removed with a poultee, and the open wound treated with a simple ointment. Two weeks later the pyrogallie acid ointment of increased strength, two and a half drachms to the ounce, was again used. Under this remedy, which acted as a caustic, together with repeated poulticing when a thick eschar formed, an open suppurating wound was produced. This treatment was persevered with for six weeks, when the wound was allowed to granulate under a simple emollient ointment. It was noticed that as long as the pyrogallie acid ointment was applied the itching was either in abeyance or entirely absent, returning as soon as this was abandoned for a simple ointment. During the summer the wound, including the ulcer, healed over, became paler, and the breast was in every way more comfortable, but three months afterwards the disease gradually relapsed into its former state. In October, 1882, a vigorous treatment with inunctions of tar ointment, and later with *sapo viridis* and tar ointment was instituted, but the tar produced redness, heat, and swelling, and had to be discontinued. The itching was subsequently markedly relieved by a lotion consisting of a drachm each of sulphate of zinc and sulphuret of potash, a half drachm of glycerine, and four ounces of water. A month later, frictions with *sapo viridis* and inunctions with sulphur ointments of different strengths were resorted to, but without benefit.

On the 16th of December, 1882, in consultation with Dr. Strawbridge, and with the assistance of Dr. Stelwagon, the wound was operated upon with the dermal curette, or scraping-spoon, the patient being under ether. Much of the tissue of the general surface of the patch was found to be soft, as in degenerating lupus vulgaris, and came away readily, but about the region of the nipple the tissues were tough, and could be removed only with difficulty. A cavity three-quarters of an inch in depth and an inch in width, was made in the site of the nipple. The wound was dressed with simple ointment, and in two months had healed so kindly that it was thought a cure would probably result. But such was not the case, for it now began to reappear, accompanied with itching, and in six weeks had resumed its former characteristics. Excision of the whole gland was now advised, but at the time of writing the patient has not decided to submit to the operation.

CASE II. Mrs. S. A. B., aged 40, brunette, spare and debilitated, the mother of three children, applied to me October 15, 1882, for advice concerning a chronic inflammatory disease of the skin affecting the left breast and nipple, which she stated had defied the most varied treatment. The disease had begun six years before, in the form of a fissure on the nipple, which persisted, accompanied with slight oozing and crusting, and with itching, for about a year, without much change, when under the use of ointments and poultices, the disease began to spread slowly over the nipple. Soon the nipple showed signs of contracting and of sinking into the breast, and during the next three years, becoming smaller each year, entirely disappeared. After this the disease spread slowly around the nipple, involving the areola, accompanied by slight oozing from time to time of a puriform nature, with itching, which has been gaining in intensity from year to year. At first this latter symptom was insignificant, but for the last three years it has been constant and most violent; of late it has been almost intolerable. At first the increase in the size of the lesion was scarcely perceptible from year to year, but during the last six months it has been much more rapid.

Upon examination the affected breast is noted to be small, but is larger, fuller, and firmer than the sound one. In places it is distinctly lumpy, hard, and even knotted, feeling like an ordinary scirrhus in the early stage. This indurated state of the gland, she states, is a recent development. The lymphatic glands are not involved. The nipple and areola are entirely wanting, a glazed, here and there excoriated, partly crusted, bright, violaceous red, chronically inflamed, infiltrated, rounded patch, occupying this region. The lesion is firm; is about two inches in diameter; has a slightly raised border, and is very sharply defined against the sound skin. It has an eczematous look, and at first glance would doubtless be mistaken for this disease. The sharp line of demarcation, the border, the infiltration, the glazed surface, and the vivid colour, are, however, peculiar. Taken between the fingers the infiltration is noted to be superficial, and is not so deep as one would suppose from the appearance.

It is not necessary to dwell upon the treatment to which the lesion was subjected; suffice it to say strong ointments of calomel, tar, and pyrogallie acid were in turn resorted to without benefit. The pyrogallie acid ointment, from one to three drachms to the ounce, applied continuously, spread upon a cloth, with the view of producing a caustic effect, was employed for several months, the crust being removed from time to time with a poultice. During the time that the ointment was applied and the lesion was discharging, there was great relief to the itching. Upon the wound granulating, however, the itching invariably returned, and the whole breast, moreover, became full and somewhat painful. In view of the indurated lesions within the gland (without doubt of a cancerous nature), and the inefficacy of the local treatment to relieve the infiltration, removal of the gland by excision was proposed, but the patient was unwilling to have the operation performed.

I have reported these cases to show the clinical features of a disease which is entitled to special consideration. It must be distinguished from eczema, which it resembles, and from ordinary cancer, which it is altogether unlike in its earlier stages. It seems to occupy a ground having the characters of both diseases. The report is interesting as showing the natural history of the affection. This is peculiar. The course of the process is emphatically chronic. In both instances, moreover, the progress of the disease was insidious as well as slow. Nothing of a malignant nature was suspected until after the lapse of five and ten years respectively. The itching, which eventually became such a marked symptom, was in both cases insignificant until the affection had existed several years. It may be said not to have manifested itself until after the process had been well established. In this respect the disease differs decidedly from eczema, where itching is one of the first signs noted. The circumscribed, sharply defined outline of the lesion, and the slightly elevated border, are also symptoms which do not obtain in eczema. The brilliant colour of the lesion is striking, and is more marked than in eczema. The absence of the "eczematous surface," characterized by appreciable discharge or by vesicles, pustules, or puncta, coming and going from time to time; and the absence of exacerbations, so usual in eczema, may also be

referred to. A point to which attention may also be directed is the infiltration, which is firm or even hard, but is not deep-seated. It is rather superficial. In eczema, on the other hand, it is soft.

The pains coming on later in the course of the disease, and the indurated, lumpy, or knotted lesions within the gland structure, of course point strongly to the malignant or cancerous nature of the disease, the existence of which cannot be doubted.

ARTICLE X.

EXPERIMENTAL KERATITIS: ITS BEARING UPON STRICKER'S THEORY OF INFLAMMATION. By JAMES L. MINOR, M.D., Ophthalmic Surgeon to the Randall's Island Hospitals, Pathologist and Assistant Surgeon to the N. Y. Eye and Ear Infirmary.

THE favourable reception that has been accorded to Prof. Stricker's theory of the pathology of inflammation as presented in the *International Encyclopædia of Surgery*, prompts me to publish an article which I prepared a year and a half ago, bearing upon the subject. It was not published before because it contained nothing essentially new. I now present it to add my experiments to those of Senftleben, Councilman, Axel Key, Eberth and his pupils, and others. Prof. Stricker has entirely ignored the results obtained by these investigators, in spite of the fact that his own methods have been employed in obtaining specimens, and that they were exact counterparts of those described by himself. These specimens, when subjected to the influence of dyes, that stain parts before uncoloured, show changes that are diametrically opposed to his theory. The experiments are neither difficult nor complicated, and one familiar with the microscope may easily verify them, and prove to himself and to others the incompleteness of Stricker's work, and the consequent fallacy of his argument. Without further discussion or excuse the article is presented in its original form.

During the past year, at the Pathological Laboratory of the Bellevue Hospital Medical College, under the direction and the kind assistance of Prof. Welch, I have performed a number of experiments to determine the origin of pus cells, in inflammation of the cornea of cats, dogs, and frogs;¹ and the results which I invariably obtained are so much at variance with

¹ Many of my experiments were made during the spring, the most favourable time, according to Stricker; and most of them were performed upon cats, nearly grown, which he insists upon. I may say, however, that I experienced no difficulty in obtaining his pictures from the corneæ of cats of all ages, dogs, and frogs, and at all times of the year.

those claimed by some of the eminent pathologists of the present day, that I feel little hesitation in presenting them; for they can be verified by any careful observer. It is not my purpose to discuss the process of inflammation, nor will I attempt to enter the field of literature bearing upon the subject. It will suffice to state in the briefest manner, the two leading theories concerning the origin of pus cells: *first*, that of Cohnheim, who teaches the cell emigration theory, claiming that pus cells are leucocytes or wandering white blood corpuscles, and denying their origin from other sources; and *second*, that of Stricker, who adopting, with some modification, the teachings of Virchow, holds that pus cells are not emigrated cells, but that they originate from the cells of the inflamed tissue, they having returned to their embryonal condition, and from these pus cells are differentiated.

It will not be amiss to give the anatomy of the cornea before studying the changes that we shall observe in its structure. The anterior boundary of the cornea is formed by stratified epithelium; its posterior covering is a single layer of endothelium. Underneath both the epi- and endothelial coverings is a thin hyaline layer (Bowman's and Descemet's respectively) showing fine fibrillation according to some histologists. Between the last two layers the proper corneal tissue is found. It consists of fine connective tissue fibres, which run in parallel directions, forming bundles, and these in turn unite to form laminae that run in various directions, parallel with the surface, but frequently at right angles to each other, and form the different layers of the cornea. Between the laminae, and flattened by them, lie numerous nucleated cells—the corneal corpuscles—irregular in shape, and presenting a number of processes, which communicate with adjacent corpuscles, not necessarily between the same laminae. Other cells—leucocytes—are often seen, and sometimes pigment cells are observed. These, with the nerve fibres, embrace about all that is to be found.¹ I have found the cat's cornea most satisfactory, because it is easy to laminate, and furnishes a large surface for experiment and observation. Irritation of the centre of the cornea was caused by various substances; the most satisfactory were silver nitrate (solid) and potassa fusa, and after intervals varying from twelve hours to a week, the cornea were removed for examination. The agents used for staining were silver nitrate and gold chloride; and subsequently the sections so stained were further stained with hæmatoxylin or carmine. The corneae to be stained with silver nitrate, were thoroughly painted with the solid stick while the ani-

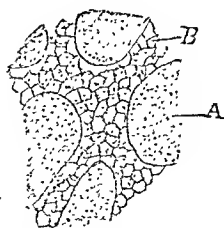
¹ Stricker thinks that the structure of the living cornea is probably homogeneous, because differences in structure appear only in post-mortem specimens and as a result of chemical or staining agents, which he thinks are due to elective affinity of certain tissue elements to these agents. Although his view conflicts with the view of the anatomy of the cornea generally accepted, it will not interfere with the question at issue, i. e., the origin of pus cells.

mal was living, and ten minutes later the animal was killed; the corneæ were removed and washed in distilled water, and placed in acidulated water, where they remained usually about twenty-four hours, exposed to diffuse daylight, when they were ready for lamination or section cutting. Silver stains the intercellular substance a brownish color, and leaves the corpuscles and their processes uncoloured, so that they appear as clear spaces in the coloured field. The corneæ to be stained with gold were removed as soon as the animal was killed and washed in distilled water, and placed in fresh lemon juice, where they remained for five minutes, when they were taken out and washed again and placed in a half per cent. solution of gold chloride, in which they remained for half an hour, more or less, whence they were removed and placed in a redning fluid, either acidulated water or, better, Pritchard's fluid (amylic alcohol 1, formic acid 1, water 100). Here they remained for twenty-four hours or more, when they were ready for lamination or cutting. Gold stains the corpuscles and their processes a purplish colour, and leaves the intercellular substance uncoloured, as clear intervals in the field—giving a picture which is the negative of that of silver. Hæmatoxylin stains the nuclei a deep blue, and the cells a more delicate tint of the same colour. Carmine stains the nucleus a delicate red or pink, and the remainder of the cell a lighter hue of the same colour.

Let us take a silver-stained cornea, 72 hours after irritation of its centre with caustic potash. A thin specimen, prepared by lamination, or cutting, is mounted in glycerine. The staining characteristic of silver is observed, and nothing peculiar is noticed until we approach the zone of the irritation; here we find the spaces corresponding to the corneal corpuscles and their processes, enlarged and occupied more or less completely by a network of fine brown mosaic tracings, claimed by Stricker to be the outlines

of pus cells which have originated from corneal corpuscles. If the staining is good, cells resembling pus corpuscles can sometimes be recognized. (See Fig. 1.) If this specimen is now stained with hæmatoxylin, a beautiful picture is presented, and a most remarkable change is brought about. The silver staining is unchanged; the corneal corpuscles are now to be seen, they are of a bluish tint, and their nuclei are coloured a deeper hue; while the pus cells, with their often horseshoe-shaped nuclei (a peculiarity of the white blood-corpuscles of the cat), are stained a dark blue. We can now study the appearance, the arrangement, and the relation of parts with an intelligenec impossible before this distinguishing difference was produced. We can readily map out zones, differing essentially from each other

Fig. 1.



Cat's cornea, 72 hours after central irritation with caustic potash, stained with silver nitrate. A. Intercellular substance of a brownish colour. B. "Corneal spaces," occupied by delicate mosaic tracings, the outlines of pus cells.

in appearance. The first zone embraces the periphery of the cornea, in which the corneal corpuscles are healthy and unchanged, and where there is an abundance of pus cells, many of which are of the ordinary appearance, with horseshoe-shaped nuclei, while others are drawn out as small rods, with elongated nuclei. In reference to the position of the pus cells, most of them occupy the spaces conjointly with the corneal corpuscles, but many of them lie in the intercellular tissue; and it is here that the rod-shaped pus cells are chiefly found. Some of the rods have one extremity in a corneal space, while the other is embedded in the intercellular substance. In passing through the interspaces of the fibrous tissue of the cornea, the leucocytes assume the size and shape of the channels they traverse thus giving rise to the rod-shaped form. The second zone lies between the corneal periphery and the central eschar; here the corneal corpuscles are unchanged, and pus cells are scanty or absent. The third and last zone embraces the central eschar and the immediately adjoining tissue.

The eschar, which has not been changed by the hæmatoxylin, is a brownish granular mass, devoid of structure. The parts adjacent to this show the intercellular substance to be diminished, and encroached upon by enlarged corneal spaces. The corneal spaces are in most instances filled with pus cells, containing the horseshoe-shaped nuclei observed in other zones; but in those spaces not fully occupied by pus cells, the outlines of non-nucleated shrunken (dead) corneal corpuscles can be recognized. And in some instances it is possible to detect the body of a dead corneal corpuscle beneath an almost complete bridge or layer of parallel rod-shaped pus cells—the intervals between the rods are sufficient to allow a clear distinction of parts beneath. As we approach the middle zone from this point, it will be noticed that the pus cells become less numerous, and that the corneal corpuscles change at once to the normal condition, or present certain changes, that will be presently referred to. (See Fig. 2.) It is evident from a study of the above description and the accompanying cut, that the pus cells did not originate from the corneal corpuscles. That leucocytes possess a remarkable power of emigration, has been incontestably proven by Cohnheim and others; and their immigration accounts for the presence of pus cells in our specimen, in a far more satisfactory manner than can any other process. Their abundance in the peripheral zone is plainly due to emigration from adjacent conjunctival and scleral ves-

Fig. 2.



Same specimen after staining with hæmatoxylin. Both A and B the same as in Fig. 1; B, in this figure, is seen to be occupied by corneal corpuscles (a) and pus cells, both round (b) and rod-shaped (c).

sels—both of the latter tissues being loaded with them. The great number about the eschar is also to be explained by immigration—for here we have a denuded surface exposed to the conjunctival membrane, which furnishes a bountiful supply—the conjunctiva itself being hyperæmic or inflamed. The arrangement of the rod-shaped cells is characteristic and striking, the rods in many instances form radii with the eschar as a centre, a fact which clearly indicates that they had entered here, on their passage into the corneal tissue.

It was stated above that changes sometimes occur in the corneal capsules surrounding the eschar. This change consists in sending out delicate thread-like processes or off-shoots (regeneration spears of the Germans), the direction of which is always towards the eschar. And at some points the extremities of two spears or processes will approach each other and coalesce. Here a circumscribed enlargement is formed, from which new spears may spring. Other individual spears will terminate in bulbous enlargements, which present secondary processes. This proliferation of corneal corpuscles is plainly not pus formation. It is a regenerative process by which the living corpuscles attempt to repair the destruction caused by the caustic, by forming new corneal corpuscles.

The specimen just studied was selected because it illustrated all of the conditions which it was desired to show. It is exceptional to find one presenting all of these appearances. They will vary according to the degree of irritation, and also according to the time at which they are examined. When the cornea is moderately irritated, without an abrasion of its surface, the number of pus cells about the eschar will be small, while they will abound in the periphery of the cornea, and the regeneration spears or processes will be numerous. Whereas, if the irritation has been severe, and if there is a loss of substance, such as follows free cauterization; the pus cells about the eschar will be abundant, and greatly in excess of those in the peripheral zones, and the regeneration spears will be slower in making their appearance. The corneal corpuscles surrounding the eschar in this instance are overcome by the pressure of leucocytes, which force their way through and crowd themselves into the adjacent tissue; and it is only after this pressure is relieved by sloughing of the parts that the regenerative process shows itself. The regeneration spears were not observed in any specimen earlier than thirty-six hours after cauterization. They are seen to greatest advantage in gold-stained specimens. (See Figs. 3 and 4.)

As a summary, I may say, that Strieker rests his conclusions upon the appearances presented by silver-stained specimens; that he is correct in claiming that the mosaic tracings indicate the outlines of pus cells; but that he is wrong in his conclusions as to their origin; and that he will continue to be mistaken so long as he confines himself to a single staining (silver). He limits his study to the eschar and its immediate vicinity,

Figs. 3 and 4.

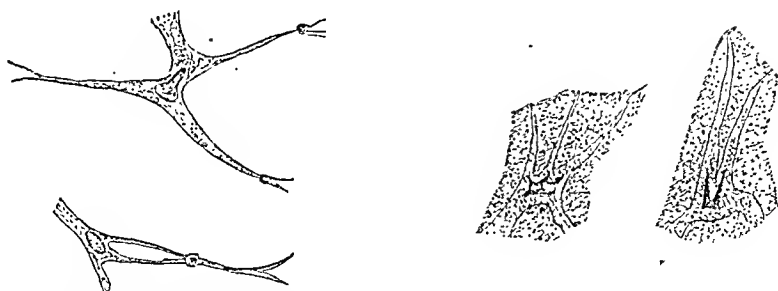


Fig. 3. Cat's cornea, 86 hours after central irritation with caustic potash, stained with gold chloride, and showing the so-called regeneration spears.

Fig. 4. Cat's cornea, 86 hours after central irritation with caustic potash, stained with silver, showing regeneration spears.

All of these specimens were taken from the zone surrounding the eschar.

because silver-stained specimens show changes in no other locality. We claim to have established the immigration theory; because the pus cells are similar in appearance to the white blood-corpuscles (both have horse-shoe-shaped nuclei in cats); they can be traced from the corneal periphery to the point of irritation; and having also gained access to the corneal tissue through the eschar, they are most abundant immediately around this centre, where we can still recognize dead, but intact, corneal corpuscles. The corneal corpuscles show signs of proliferation, some time after the cell immigration has set in; and this proliferation gives rise, not to pus cells, but to new corneal corpuscles, and they are strictly limited to the zone surrounding the dead corneal corpuscles; whereas leucocytes, or pus cells, in abundance, can be found in various parts of the cornea, at a distance from this point.

NEW YORK, April, 1883.

ARTICLE XI.

ENLARGEMENT OF THE BRONCHIAL GLANDS AS A CAUSE OF IRRITATION OF THE PNEUMOGASTRIC NERVE. By EDWARD T. BRUEN, M.D., Physician to the Philadelphia Hospital, and Demonstrator of Clinical Medicine in the University of Pennsylvania.

THERE are certain disorders affecting the rhythm of the respiratory functions which approach the asthmatic type of dyspnoea, and yet which never result in a paroxysm of asthma. The function of the pneumogastric nerves is governmental chiefly of the rhythm of the respiratory action. The tenth nerve contains both accelerator and inhibitory fibres, and Rosenthal declares the respiratory centre to be the seat of two forces of con-

fluctuating nature, the one labouring to generate respiratory influences, the other tending to offer resistance to the generation of these impulses. The alternate victory of the one over the other leading to the rhythmic discharges of force and the regulation of respiration as we find it in health. Hence, when the vagi are divided the central resistance is increased, owing to the absence of the diminishing effect of the usual afferent impulses. In consequence the respiratory impulses take a longer time in gathering sufficient head to overcome the increased resistance, and therefore the respiratory acts are less frequent, though the discharge, when it does occur, is proportionately more forcible. Stimulation of the divided vagi, on the other hand, by increasing afferent impulses, and so diminishing central resistance, renders discharges of accelerator force more frequent.

We also know that the superior recurrent laryngeal nerve is composed mainly of inhibitory afferent fibres, by the stimulation of which respiration can be brought to a standstill, the respiratory apparatus remaining as at the close of expiration. This effect can also be produced by first exhausting the neurility of the accelerator afferent fibres of the main trunk of the pneumogastric nerve, which permits the inhibitory fibres to obtain the controlling influence, and thus reduces or stops the respiratory action, just as when the superior laryngeal branches are stimulated. Now, pressure within the chest, exercised upon the pneumogastric nerve or its branches which supply the bronchial tubes, may excite irritation of the afferent nerve thereby reducing central resistance, and the accelerating impulses may be discharged more frequently.

We meet clinically four varieties of asthma. One the common form of spasmodic asthma often associated with or preceded by emphysema and bronchitis, attended by spasm of the bronchial tubes, and other familiar phenomena. A second form is known as cardiac asthma, often observed in association with emphysema. A third variety is the asthma which is sometimes associated with the forms of Bright's diseases of the kidney called uræmic asthma. This variety is dependent upon a spasm of the arterioles of the lungs, induced by the direct impression of the circulating undepurated blood upon the governing vaso-motor centres. This form is not associated with spasm of the bronchial tubes, for auscultation can furnish satisfactory evidence that air enters and passes from the bronchial tubes without hindrance. This form of asthma once thought of, is easily recognized by being associated with dropsy or arterial thickening, with accentuated second sound or other evidences of renal disease.

A fourth form of asthma may be more correctly termed a rhythmic disorder of respiration dependent upon pneumogastric irritation.

In the *Philadelphia Medical Times* of October 11, 1879, may be found reported a case of aneurism of the ascending aorta, giving origin to a tumour about the size of a hen's egg. The tumour was filled with dense

laminated clot. Passing over the inferior surface of the tumour was the pneumogastric nerve, which was compressed between the tumour and the bodies of the vertebræ. In this case there were paroxysms of dyspnœa, at first very light; merely noticed as spells of shortness of breath; but they rapidly increased in severity and frequency, *pari passu* with the enlargement of the tumour, until they occurred almost daily. In addition to this paroxysmal dyspnœa there was constant dyspnœa from pressure of the aneurism on the trachea and bronchial tubes. The emphatic observations in the case were the asthmatic paroxysmal nature of respiratory disturbance, its very mild onset amounting only to shortness of breath, with coughing, and the sudden aggravation of the symptoms which presumably occurred because of the sensitiveness of the nerve to the influence of non-aërated blood.

In the hysterical state functional disorders of respiration are very common, apparently dependent upon reflex irritation of the pneumogastric nerve from some disarrangement of the sexual organs. Exclusive, however, of reflex pneumogastric irritation from this cause, the design of this paper is to invite attention to a group of symptoms presented by a class of cases which may possibly be explained as having their origin in *intra-thoracic* pneumogastric irritation.

CASE I.—In the early part of the winter of 1880 an unmarried lady, about 24 years old, applied to me for advice. She was of a distinctively scrofulous habit, testified by the facies, by a history of suppurating glandular tumours in the neck, suppuration in the axillary glands during adolescence, and a susceptibility to catarrh. Enlarged tonsils, laryngitis, bronchial catarrh, loss of flesh and appetite, with feelings of lassitude were the general symptoms.

The special phenomena were shortness of breath, inability to thoroughly inflate the lungs, and pain over the back to the right and left of the first and second dorsal vertebræ, mostly on the right side. There was a troublesome metallic laryngeal cough during most of her illness, with some expectoration of glairy mucus.

There was no fever; she complained of substernal fulness or pressure. The physical signs were normal resonance over the lungs anteriorly, in the axillæ, and over the bases posteriorly. There was impaired resonance in the inter-scapula region on both sides of the vertebræ extending from the first to the third dorsal vertebræ, especially marked on the right side. The respiratory murmur was everywhere normal, save that in the area of dulness there was feeble bronchial breathing, and on the right side it acquired a whistling tone. Over the left apex, in the inter-scapular region, the respiratory murmur was positively feeble. Vocal resonance was not increased at any part of the chest.

CASE II.—A girl of 18, who enjoyed apparently good health, with rosy cheeks, regular in menstrual habit, not at all nervous, as the phrase is popularly understood, consulted me for the following symptoms: Pain in the back over the inter-seapular region on the left side, near the second dorsal vertebra. Cough, which had been troublesome for two months with shortness of breath. The want of breath manifested itself in a peculiar way. If desired to breathe, during an examination of her chest, she

was able to draw a few deep inspirations, and then was obliged to draw them in a much more shallow way, or she said she would have a spell resembling asthma. There was a moderate degree of vesiculo-tympanitic resonance over the lungs; no dulness at any point. Respiratory murmur was feeble over the upper lobes, more distinct over the lower. The rhythm of respiration was jerky, expiration low-pitched and indistinct, inspiration shortened. Paroxysms of shortness of breath would occur on exertion, producing a sense of suffocation, never occurring at night, or coming on suddenly. There was constant feeling of fulness and substernal tightness. The family history of this girl indicated a scrofulous inheritance. Her father suffered from Pott's disease of the spine, and two aunts had died of pulmonary phthisis.

CASE III.—A young man, 22 years of age, who had been under treatment for a general bronchial pharyngeal and nasal catarrh for eighteen months. He came to me in the spring of 1882 with the same subjective symptoms. There was a general deficiency of nervous tone induced by a course of assiduous study. Family history good but diathesis scrofulous, so that it was fair to infer that scrofulous changes might develop when the system was reduced. Dyspnoea was also a symptom and was of the type described in Case II. There was marked general relaxation with catarrh of the respiratory mucous tract.

It is perhaps well to observe that in each of these cases the heart was sound, but its rhythm was more or less modified by an increase in the rapidity of its action. It is unnecessary to epitomize other cases, though at least ten instances of a similar nature appear on my records.

An analysis of the symptoms will not fail to show that respiratory innervation was seriously at fault in each case. Enlargement of the cervical chain of lymphatics can be traced to catarrh of various parts of the upper respiratory tract, and this is particularly the case in the scrofulous, or in those artificially reduced to this state, or in children who are badly fed and lodged.

¹In cases of epidemics of influenza the bronchial glands have been described as undergoing enlargement, occasioning more positive physical signs than those mentioned in this paper. In hay-asthma the type of breathing suggests pneumogastric irritation and invites an examination of the bronchial glands, as affording a new avenue of therapeutical attack. Guineau de Mussy has written in some detail of the enlargement of these glands in pertussis, and foreign literature contains much that is interesting, but which has been little dwelt upon by American writers. Enlargement of the bronchial glands has not been frequently noted in cases of persistent catarrh of the bronchial passages as a cause of respiratory embarrassment and consequent bronchial and pulmonary changes.

²But it is evident that enlargement of the bronchial glands can readily

¹ A Contribution to the History of Influenza, by Dr. Guitéras and Dr. J. William White. A valuable paper with especial reference to Enlargement of the Bronchial Glands; Phila. Med. Times, April 10, 1882.

² Sappey, Anatomie descriptive. An excellent description of the relations of the nerves to the other structures at the root of the lungs.

affect the pneumogastrics, since these nerves pass before and behind the œsophagus and are environed by these glands. The enlargement of the bronchial glands may be acute, subacute, or chronic; the symptoms can therefore be manifested for a variable period of three to many weeks.

¹The effect of bronchial enlargement upon the lung through the pressure on the pulmonary plexus is full of interest. Congestion, collapse, pneumonia have each been described. Reference to the literature of the subject can be so readily made that I forbear to lengthen this article by reproducing further changes in detail. In only one of my cases was there serious pulmonary congestion.

The physical signs on auscultation and percussion by which enlargement of the bronchial glands can be recognized are applicable chiefly when the enlargement is considerable.

The physical signs by percussion, as demonstrated by M. Guineau de Mussy, consist in percussion over the spinous processes of the cervical vertebræ, the course of the trachea. Following this line in the healthy subject, a distinct tubular sound is elicited by percussion down to the point of bifurcation of the trachea at the level of the fourth dorsal vertebra. Opposite the fifth and downward we get the lower-pitched pulmonary resonance. When the tracheal and bronchial glands are enlarged, the tubular sound over the upper dorsal vertebræ is replaced by dulness, which may contract sharply above with the tracheal and below with the vesicular resonance. Dulness on percussion may easily be absent since the inter-scapular region is covered by thick parietes.²

Auscultation gives variable results, which have already been sufficiently described in the narrative of the cases. The usual physical signs of congestion of the lungs may be met with when there is associated pulmonary engorgement.

The difficulty in the diagnosis of such cases consists in separating them from cases of early phthisis. One must rely mainly on the absence of the combination of physical signs required to render the presence of incipient phthisis certain. These are impaired percussion resonance,

¹ Guy's Hospital Reports, vol. v. 1859, on Destructive Changes in the Lung from Disease of the Mediastinum invading or compressing the Pneumogastric Nerves or Pulmonary Plexus. Lancet, March and April, 1878, S. P. Irvine on Collapse, Emphysema, and Destructive Pneumonia in Association with Tumours compressing the Bronchi. Ziemssen's Cyclopædia of Med., vol. iv., Stenosis of Trachea and Bronchial Tubes, by Riegler. Ogle, Effect of Aneurismal Pressure; London Path. Transaction, vol. xvii. Edinburgh Med. Journal, 1850-1851, Effects upon the Lung of Bronchitis and Bronchial Obstruction.

² Rilliet and Barthez, *Maladies des Enfants*. Speaking of *adénopathie bronchique*, or *tuberculisatîon des ganglions bronchiques*, " Dans un grand nombre d'affections chroniques et dans beaucoup de congestions aiguës des organes thoraciques, on constate des modifications du bruit respiratoire souvent limitées à un seul côté ou même à un seul lobe sans lésion locale appréciable. Rien n'est plus commun dans la phymatose dans la rougeole, dans la coqueluche."

some form of bronchial breathing, possibly fine moist râles and increased vocal resonance. The last two physical signs are not present in cases of bronchial enlargement. Pain in the back and disturbance of the respiratory rhythm are not often present in phthisis. Hysteria, uterine, or spinal disorder may be eliminated by careful examination.

Finally, the beneficial results of treatment may be appealed to in order to sustain the pathological hypothesis of the etiology of the cases. Counter-irritation must be made a principal feature of the therapeutics. It can be effected by painting a broad band 5 x 10 inches down the inter-seapular space, using the following formulæ:—

R. Ol tiglii, ʒj.
Ether. sulph., ʒij.
Tr. iodinii, ʒv.
M. Sig.—Use as a paint.

This produces pustulation, and is one of the most efficient means of counter-irritation. It must be applied and allowed to dry before the clothing is assumed, so that the croton oil may not be transferred where it is not desired. In place of the above, an ointment may be used of the biniodide of mercury, sixteen grains to the half ounce of vaseline, rubbed into the same region. After producing vesication, it should be suspended, and again resumed after the skin has peeled off. I have sometimes found it necessary to prolong treatment for a year. Benefit may be expected in two or three weeks, and the average duration about ten weeks to three months, unless there be marked scrofulous diathesis. Internally, the most important measure is the continued use of calomel, one-twentieth to one-fiftieth of a grain. The bichloride or the protiodide of mercury, in corresponding doses, if, for any reason, calomel is contraindicated. Lugol's solution may be prescribed, but the digestive apparatus cannot often tolerate it. When the cough is severe, the muriate of ammonia can be combined effectively with the bichloride of mercury. Cod-liver oil, the syrups of the phosphates and small amounts of iron are useful. The disorder of the respiratory rhythm is only very gradually remediable as the cause of pneumogastric irritation is removed. Meanwhile the continuous use of small doses of sulphate of strychnine, the one-fiftieth or the one-hundredth of a grain as a respiratory stimulant, is satisfactory. It may be conveniently prescribed in the same pill with the calomel. When asthmatic dyspnoea is prominent, belladonna internally or stramonium cigarettes can be ordered. Arsenic may be held in reserve. Opiates and bromides, to say the least, produce only a palliative effect. Finally, much benefit may be derived through the influence of change of climate upon nutrition.

ARTICLE XII.

A STUDY OF SOME RECENT EXPERIMENTS ON SERPENT VENOM. By ROBERT FLETCHER, M.R.C.S.E., Washington, D. C.¹

THE destruction of life from the bites of poisonous serpents is so extensive, the danger so insidious, and the fatal result follows so speedily, that at all times the subject has been one of especial interest and importance. The medical journals of India, as might be expected, abound with details of cases, of tests of supposed antidotes, and of experiments to determine the mode of action of the venom. Sir Joseph Fayrer states the average mortality from serpent-bites in India to be fully 20,000 annually. In 1869 the returns were obtained, through official sources, from a large part of India with unusual care and accuracy. In a population of nearly 121,000,000, representing an area of less than half the peninsula of Hindostan, the deaths were 11,416, or nearly one in 10,000.

Of these deaths, there were caused by—

Cobra	2,690
Krait (<i>Bungarus ceruleus</i>)	359
Other snakes	839
Unknown snakes	6,922
No details	606
	<hr/>
	11,416

The number of deaths from "unknown snakes," which seems surprisingly large, is easily understood when it is remembered how general among the natives is the custom of sleeping on the ground. A person is bitten, and the snake escapes unseen in the darkness.

In 1880, 212,776 poisonous snakes were killed and paid for; and in 1881, 254,968.

Even in Europe, the number of accidents from snake-bite is very large. In one department of France, La Haute-Marne, the government paid, in six years, for the destruction of 17,415 vipers.

Before describing the recent researches of Lacerta, of Gautier, and of Weir Mitchell, which is more especially the object of this paper, it will be useful to make a brief summary of the most important investigations which had preceded them.

The first writer who published his experiments with serpent venom was Francisco Redi, an Italian. His observations on the viper appeared at Florence, in 1664.² His work was far surpassed in value by that of his countryman, Felix Fontana, whose "*Ricerche filosofiche sopra il veneno della vipera*," was published at Lucca, in 1767. This classic work in toxicology has been translated into many languages. Fontana's experi-

¹ Read before the Philosophical Society of Washington, May 19, 1883.

² Osservazioni intorno alle vipere. Fr. Redi, Firenze, 1664.

ments were 6000 in number, and are admirable for the patient care and fidelity with which they were conducted. His knowledge of physiological chemistry was, of course, limited, but many of his conclusions have been confirmed by modern researches.

In 1845, Prince Lucien Bonaparte analyzed the venom of the viper,¹ and discovered an active principle which he named *viperine* or *éclidnine*. This was the first chemical analysis which had been made of serpent venom.

But the most important contribution to our knowledge of the subject is to be found in the elaborate series of experiments with rattlesnake venom, conducted by Dr. Weir Mitchell, of Philadelphia. His first account of them appeared in the *Smithsonian Contributions to Knowledge* for 1860, forming 117 quarto pages,² and his second essay appeared in the *New York Medical Journal* for January, 1868.³ The earlier work begins with a full account of the anatomy of the head of *crotalus*, including the histology of the poison glands, and the action of the muscles concerned in the act of striking. This is followed by researches into the physical and chemical characteristics of the venom, and into the manner in which it acts upon cold-blooded and warm-blooded animals. Its effects on man, and the action of the principal known antidotes are next discussed, and an excellent bibliography completes the work. In his second essay, Dr. Mitchell announced some corrections of his views, as the result of further experiments. A brief account must be given of some of his more important conclusions.

Rattlesnake venom is a glutinous substance resembling a thick solution of gum acacia, in colour varying from a pale emerald-green to an orange or straw colour. Its specific gravity is about 1.044. When completely desiccated it resembles dried albumen. Dr. Mitchell frequently tasted the venom and never perceived any pungency or acidity, or benumbing of the tongue, qualities which have been often attributed to it, as well as to viper venom. Its reaction was always acid. It is unnecessary to give an account of the investigations made into its chemistry, as they are superseded by Dr. Mitchell's recent experiments. The toxicological effects of *crotalus* venom were the subject of a long series of experiments, which are fully detailed. The conclusions may be briefly stated.

Venom is harmless when swallowed. I. Because it is incapable of passing through mucous surfaces. II. Because it undergoes some change

¹ *Ricerche chimiche sul veleno della vipera*, pel Principe L. L. Bonaparte (letto in occasione della quinto unione degli Scienziati Italiani, tenuta in Lucca l'anno, 1843). *Gazzetta toscana delle scienze medicofisiche*. Firenze, 1843, p. 169.

² *Researches upon the Venom of the Rattlesnake, with an Investigation of the Anatomy and Physiology of the organs concerned*, by S. Weir Mitchell. *Smithsonian Contributions to Knowledge*, Washington, 1860, 4to. 117 pages.

³ *Experimental Contributions to the Toxicology of Rattlesnake Venom*, by S. Weir Mitchell, *New York Medical Journal*, 1868. Also, Reprint.

in the process of digestion which allows it to enter the blood as a harmless substance, or to escape from the intestinal canal in an equally innocent form. The rectum of the pigeon does not absorb the venom, and it produces no effect on the conjunctiva of animals.

The venom passes by endosmosis through serous membranes with great rapidity. Dr. Mitchell contrived to place a loop of the peritoneum of a chloroformed rabbit under the microscope; the circulation was beautifully exhibited, and, upon a drop of venom being deposited on the membrane, after the lapse of a minute, a sudden eruption of blood-corpuscles took place at the bifurcation of a capillary vessel followed by similar occurrences in other portions. The same phenomena appeared on the bared surface of muscles thus poisoned. This action, together with the defect of coagulability of the poisoned wound, accounts for the excessive hemorrhage about fang wounds.

In acute poisoning, where death rapidly ensues, the coagulability of the blood is not generally impaired, but where the symptoms are prolonged, the blood, after death, does not coagulate. The blood globules, according to Mitchell, are unaltered in venom poisoning, though he observed, in a few chronic cases, some disintegration of the edges. I shall recur to this point when speaking of Lacérda's and Halford's views. The cause of death, in acute poisoning in warm-blooded animals, is the cessation of respiration from paralysis of the nerve centres. The heart is enfeebled but not paralyzed. In chronic or secondary poisoning, the rapid decomposition of the blood and of the tissues locally acted upon, leave no doubt that serpent venom is a septic or putrefacient poison of astounding energy.

In his earlier experiments, Dr. Mitchell was led to believe that a rattlesnake's bite was fatal to itself, or to a fellow-crotalus. In his second essay, he comes very decidedly to the opposite conclusion. To this also reference will be made in connection with the poisonous snakes of India.

It is evident that, in experiments with venom, it will not do to depend upon the bite of the snake. If death do not follow, the escape may not be due to the virtue of an antidote but to the poison-gland having been recently emptied. Dr. Mitchell forced his snakes to bite the edge of a saucer into which the poison would drip. All his experiments were made by inoculating the venom thus obtained. From two to four drops are usually discharged at one bite, though fifteen drops were obtained from a snake which had been kept a long time in a box.

Dr. Mitchell's experiments as to antidotes resulted in the conviction of the absolute uselessness of the sulphites and hyposulphites, and the discovery that carbolic acid had no value as a true antidote, though it *delayed* a fatal result by interfering with the local circulation. This it does by its power to coagulate albumen. He mentions as a curious fact that some of the pigeons inoculated with venom and carbolic acid died with all the symptoms characteristic of poisoning by the latter powerful agent.

A case was, however, recently reported from Algeria¹ in which a French soldier was bitten by the Naja viper; alarming symptoms followed, but the application of a caustic, saturated, solution of carbolic acid, saved the man. Dr. Viaud-Grand-Maraîs also recommends this remedy.

It had been announced by Dr. Gilman,² in 1854, that serpent venom would destroy vegetable life. Dr. J. H. Salisbury made a similar declaration.³ Their experiments were few, ill-guarded, and inconclusive, but Dr. Mitchell pursued the inquiry with all necessary precautions, and found no ground whatever for such a belief. I may add that a French surgeon, who has published his researches into the poison of the viper, M. Viaud-Grand-Maraîs,⁴ positively denies that it has any effect on plants.

The late Mr. Darwin made some experiments with cobra poison on *Drosera*. He says: "I felt sure that the leaves were killed; but after eight hours' immersion they were placed in water, and, after about forty-eight hours, they re-expanded, showing that they were by no means killed. The most surprising circumstance is that, after an immersion of forty-eight hours, the protoplasm in the cells was in unusually active movement. . . . Hence I cannot doubt that this poison is a stimulant to the protoplasm."⁵

The next important work, following Dr. Mitchell's essays, is that of Dr. Joseph Fayrer, of Calcutta, now Sir Joseph Fayrer, President of the Medical Board of the India Office. It is entitled: "The Thanatophidia of India, being a description of the Venomous Snakes of the Indian Peninsula, with an account of the Influence of their Poison on Life, and a Series of Experiments. London, 1872. Imp. folio, with thirty-one plates." This is a superb work, revelling in all the luxury of finest paper, blackest print, and beautifully coloured plates. The experiments were continued through three years, and, though chiefly made upon cobra venom, include the effects of some other poisonous serpents. There are twenty-one families of Indian snakes, of which seventeen are innocuous. The four poisonous families are divided into two groups. I. Colubrine, which includes the Elapidæ and Hydrophidæ. II. Viperine, including the Viperidæ and Crotalidæ. The experiments were made upon the ox, horse, goat, pig, dog, cat, civet, mongoose, rabbit, rat, fowls, kites, herons, fish, harmless snakes, poisonous snakes, lizards, frogs, toads, and snails. As regards

¹ De la morsure de la vipère Naja en Algérie, et de son traitement par l'acide phénique. Par M. Jacquemet. Rec. de mém. de méd. mil. etc. Paris, 1881, 3e sér. 226.

² On the Venom of Serpents. B. J. Gilman, St. Louis Med. and Surg. Journal, 1854, p. 25.

³ Influence of the Poison of the Northern Rattlesnake (*Crotalus durissus*) on Plants. J. W. Salisbury, N. York Journ. Med. 1854, U. S., XIII. p. 337.

⁴ Dict. encyclop. des sciences médicales, 1881, *sub voce* Serpents venimeux.

⁵ On the Nature and Physiological Action of the Crotalus-poison as compared with that of *Naja tripudians* and other Indian Venomous Snakes, etc. By T. Lauder Brunton and J. Fayrer. Proc. Roy. Society, 1875, No. 179. Also, Reprint.

these creatures, he arrived at the following conclusions: Snake poison acts with most vigour on the warm-blooded animals; birds succumb very rapidly; a vigorous snake can destroy a fowl in a few seconds. The power of resistance is generally in relation to the size of the animal, though not altogether so; cats, for example, resist the influence of the poison almost as long as dogs three or four times their size. Cold-blooded animals also succumb to the poison, but less rapidly. Fish, non-venomous snakes, mollusca, all die. After death from cobra poison, the blood coagulates, but generally remains fluid after viperine bites.

Fayrer's experiments confirm those of Weir Mitchell, that poisonous snakes are not injured by their own venom or that of other poisonous snakes. He found, however, that the smaller and less poisonous varieties were affected by the bite of the cobra or daboia, though very slowly. From his description of the symptoms in these cases, it may be inferred that the local injury was followed by blood-poisoning, probably due to the development of micrococci.

In one important respect, Fayrer's conclusions differ from Mitchell's. He asserts very positively that snake-poison is deadly when applied to a mucous membrane, to the stomach or conjunctiva. He goes on to state that the blood of an animal, dead from snake-poison, is itself poisonous; if injected into another animal, death ensues, nevertheless the fowls and pigeons killed in his experiments were greedily sought for by his attendants, who ate them with impunity. As the process of cooking cannot destroy the deadly qualities of venom this fact strongly militates against Fayrer's theory. He found that venomous snakes, though not at all affected, or very slightly, by snake-poison, are yet very susceptible to other poisons, such as strychnia or carbolic acid. The latter destroys them very rapidly, and they seem to have a great aversion to it.

Sir Joseph Fayrer tested every known or asserted antidote, but the results were, in every case, unfavourable. The ligature, excision, and general treatment seemed to give the only chance for life, and they were often powerless. It seems reasonable, however, that experiments upon such small and susceptible animals as fowls and pigeons should not be held as conclusive against the possible virtue of an antidote, in poisoning of large mammals, including man.

Having thus rapidly sketched preceding investigations and discoveries, we come to those of recent date.

Dr. J. B. de Lacerda, Director of the Physiological Laboratory of the National Museum of Rio Janeiro, has been, during the last ten years, experimenting with the venom of Brazilian snakes, especially with that of *Bothrops jararacassu*, a serpent which closely resembles its congener, the North American *crotalus*, in the intensity of action of its venom. During that time, he has made several communications to the French Academy of Science.

In 1872, Lacerda announced that he had discovered "figured ferments" in the venom of serpents.¹ He placed a drop of rattlesnake venom under the microscope and saw the production of spores take place. The spores increased by scission and by internal nuclei. This has not been confirmed by further experiments.

The blood of a poisoned animal presented the following phenomena: the red corpuscles began by presenting little shining points which increased until the globule broke down, and was replaced by numerous ovoid corpuscles, very brilliant, and possessed of oscillatory movements. The blood obtained from animals which had died from the serpent's venom, when injected into others, hypodermically, invariably produced death in a few hours. It will be remembered that Mitchell did not observe any change in the red blood corpuscles to any marked extent.

Further experiments were made in 1879² and 1880³ by Lacerda, assisted by Dr. Conty, a pupil of Claude Bernard. This time they employed the venom of the *Bothrops jararaca*, which is held to be less potent than that of the *jararacassu*, in order to test the effect of local injections. These were made in all the tissues of the body, in the muscles, the heart, the pleura, the brain, the intestines, the stomach, and, by means of a laryngo-tracheal sound, in the substance of the lungs.

Wherever injected, unless there was vascular rupture, or an antecedent wound, there were no signs of the poison having entered into the blood. On the contrary, local evidences of inflammation were invariably produced; often of great intensity, such as phlegmonous abscess, meningo-encephalitis, acute pleurisy or pneumonia.

Of all the tissues, the lungs seemed to be the most sensitive to the effects of the venom, and death ensued almost as rapidly as when the injection was made into the blood. The intestines were very slow to absorb the poison, the stomach, above all, being almost insensible to its effects.

In 1881, a continuation of these experiments was practised on monkeys and frogs. The effect on monkeys, whether the poison were injected into the veins or into the tissues, was more rapid than on the dogs which had been the subjects of the previous experiments; while, as was to be expected, the effect upon frogs was proportionately slower. The fatal dose for a monkey, compared to that requisite for a frog, regard being had to their proportionate weight, was about 1 to 1000.

But the most interesting of Lacerda's discoveries was reported to the French Academy of Sciences in September, 1881. After proving the inefficiency of various supposed antidotes, such as perchloride of iron, borax, tannin, and other substances, he found that the permanganate of potas-

¹ Comptes rendus, Acad. d. sc., Paris, 1877, lxxxvii. 1093-1095.

² Ibid., 1879, 372-6.

³ Ibid., 1880, 549.

sium produced very remarkable results. He obtained his supply of poison by forcing the bothrops (the more deadly variety), to bite cotton-wool, and the venom which poured out upon it was dissolved in eight to ten grammes of distilled water. A syringeful of this solution was injected into the cellular tissue of the thigh or groin of a dog. In from one to two minutes after, the same quantity of a filtered one per cent. solution of permanganate of potassium was injected. The dogs, examined the next day, exhibited no evidence of injury, except a trifling local irritation at the point of injection. Nevertheless, this same solution of venom, injected into the tissues without the counter-poison, produced great swelling, abscesses, and extensive loss of substance.

Lacerda next injected the poison into a vein, and here again, the permanganate was found to be of signal efficacy. Out of 30 experiments, two only were unsuccessful, the failures being attributed to the bad condition of the dog in one case, and to the too great delay in administering the remedy in the other. A solution was made in 10 grammes of water of the venom obtained from 12 to 15 bites of a bothrops. Half a syringeful of this was injected into a vein and 2 c. c. of a one per cent. solution of the permanganate was injected, half a minute later. Beyond a slight agitation and quickening of the pulse, the dogs betrayed no disturbance or uneasiness. They were watched for several days.

In another series of tests, the experimenters waited until the characteristic symptoms of poisoning began to exhibit themselves, and when the pupil was largely dilated, the respiration embarrassed, the heart beating rapidly, and the feces and urine were involuntarily discharged, the solution was rapidly injected. At the end of two or three, and sometimes five minutes, the various symptoms would disappear, although a general prostration would remain for some time. As this lessened the dog would begin to walk and would finally recover. In all cases the solution was tested by injection into the veins without the antidote, and, in every instance, the dog died.

Lacerda formally expresses his belief that the permanganate of potassium is a positive antidote for serpent poison. His experiments were, many of them, performed in presence of the Emperor Pedro, and other persons of distinction in science.

Dr. Badaloni, of Bologna,¹ repeated the experiments of Lacerda and Couty, but without the same success. This was, I think, largely due to his different method of proceeding. Lacerda inoculated the venom, previously obtained, so that there could be no doubt as to the poisoning taking place. Badaloni compelled the viper, the serpent he employed, to strike the animal experimented on. Of course, there could be no certainty that

¹ Sul valore del permanganato di potassa quale antidoto del veneno dei serpenti (ofidi). Rapporto del Giuseppe Badaloni. Bologna, 1882. 8vo.

venom was injected, except from the symptoms. Further, Lacerda injected the antidote through the same punctures by which the venom had penetrated, while Badaloni injected it into the neighbouring tissues. In his first experiment, a rabbit was bitten on the upper lip and on a paw, and the permanganate solution was injected into the tissues of the shoulder; in fifteen minutes the rabbit died. In a second case, when the antidote was injected, two minutes after the evidences of poisoning manifested themselves, the rabbit recovered; but so did a third rabbit, without any treatment. The fourth rabbit was bitten by two vipers, and the permanganate was injected fifty-five minutes after the first bite and thirty minutes after the second; this rabbit recovered.

Badaloni's experiments are inconclusive, but are interesting from the fact that he records the temperature of the poisoned animal every three or four minutes. The temperature before the bite was almost uniform at 39.5° centigrade, and it fell in one case to 34.5° , with a steady rise as the danger diminished.

Mr. Vincent Richards,¹ of Calcutta, who had been a member of the Snake-poison Commission, upon hearing of Lacerda's investigations, instituted a series of experiments upon the effect of the permanganate on cobra poison. His conclusions were, that the salt, though not an antidote, strictly speaking, was of very considerable value in the treatment of snake-bites; that it had the power to neutralize the venom in the tissues, but had no effect if the poison had been absorbed into the general circulation. Sloughing, he found to be an almost constant result of the injection of the permanganate. His experiments as to the strength of the solution required, resulted as follows: He mixed $3\frac{1}{2}$ centigrammes (about $\frac{1}{2}$ grain) of cobra-venom with the solution and injected it into the cellular tissue of a fowl.

With a $\frac{1}{8}$	of 1-per-cent. solution,	the fowl died in 13 minutes.
" $\frac{1}{4}$	" " "	" " 11 "
" $\frac{1}{2}$	" " "	" " 18 "
" $1\frac{1}{2}$	" " "	" " 59 "
" 2	" " "	the fowl became somewhat sluggish, but recovered.
" 4	" " "	the fowl was not affected at all.

Permanganate of potash is, according to Le Bon, the most powerful disinfectant known, but he states that it exerts but little influence upon microbes.² This is a view generally held by those who have experimented with antiseptics; but Dr. G. M. Sternberg, in an article upon germicides in this Journal for April, places it second in rank as destructive of germs.

Mr. Richards advises the use of a 5-per-cent. solution, and that, after

¹ Indian Med. Gazette. Calcutta, 1882, xvii. 1; 57; 85.

² Comptes rendus, 1882, ii. 259.

the injection, the parts should be kneaded and pressed with the fingers, so as to distribute the antidote.

Lacerda's method was also tried by Theodor Aron, an assistant of Professor Binz, of the University of Bonn.¹ His experiments were made with cobra-venom which had been sent from India, in a dried state. He mentions that a part of the solution which had become absolutely putrid was scarcely at all diminished in its virulence. Of 13 rabbits inoculated with the poison, and treated with the permanganate of potassium, 7 died. He had greater success with a solution of chloride of calcium, for in 22 experiments with that antidote he saved 17 of the rabbits. He tried the effect of alcohol, of caffeine, atropine, and brucine, but all proved valueless. Aron's experiments appear to have been carefully made. He inoculated two rabbits with the same quantity of venom in each instance, and administered the antidote to one only. The other always died.

In the *Journal d'Hygiène* for September 22, 1881, Dr. de Fourier mentions having received a letter from a captain of engineers, dated at Bauaua de Itaguaby, in Brazil. Captain Rezende says:—

"While we were measuring the grounds around the imperial farm of San Luiz, one of our surveyors was bitten above the heel, about two o'clock in the afternoon, by an enormous serpent, the *jararaca perniciosa*,² which measured a metre and a half in length. Before leaving Rio I had provided myself with a bottle of the solution of permanganate of potassa, recommended by M. de Lacerda, and immediately made five hypodermic injections with it, two into the wound itself and three above the instep. The patient also drank a teaspoonful of the solution. At the time I write, eight o'clock in the evening, the surveyor limps a little, but has none of those terrible symptoms which always follow the bite of this serpent."

Professor Vulpian, in a note read to the Academy of Sciences in Paris, a short time since,³ commenting on Lacerda's experiments, declared the permanganate of potassium to be dangerous to life when introduced into the circulation. Half a gramme of the salt which he injected into the jugular vein of a small dog produced death. A great many experiments have been made, especially by Sir Joseph Fayrer, to test the action of supposed antidotes when injected into the veins or tissues of animals, without the accompaniment of the venom, and conclusions have been drawn as to their poisonous qualities, as in this statement of Vulpian's. It may be doubted whether these conclusions are warranted. The presence of venom in the blood or tissues may modify the otherwise toxic action of the antidote. It certainly does in the case of stimulants; alcohol is tolerated,

¹ Experimentelle Studien über Schlangengift. Von Theodor Aron. Centralblatt f. klin. Med., 1882, No. 31, Nov. 18.

² I suppose this is a printer's blunder for *perniciosa*; or it may be meant for the Portuguese word *preguiçosa*, sluggish.

³ Comptes rendus, 1882, xiv. 614. Études expérimentales relatives à l'action que peut exercer le permanganate de potasse sur les venins, les virus et les maladies.

without ill effects, in quantity sufficient, at other times, to produce excessive intoxication, if not even coma.

Before leaving the subject of Lacerda's experiments, a curious circumstance remains to be told. Dr. Couty, his assistant, sent a communication to the Academy of Sciences, which was read at the meeting of April 24, 1882, in which he reverses the opinion he had previously expressed, and declares that the permanganate does not even mitigate the activity of the bothrops venom when the latter is injected into the veins. He admits, almost unwillingly, that it decomposes the venom in the tissues. Dr. Couty gives an account of a few experiments he had made, in all of which the dogs operated upon died.

Lacerda has not, as yet, made any communication to the Paris Academy in reply to this statement of his former coadjutor, but he addressed a note to the *Jornal do Commercio*, published at Rio de Janeiro, in which he alludes delicately to the fact that the friendly relations between himself and Dr. Couty had been interrupted, and that, consequent upon that condition, came this surprising recantation of the latter.¹ He points out that in Couty's latest experiments, 2 c. c. of a saturated solution of venom, representing fifteen or sixteen bites of the bothrops, were injected directly into the circulation, and that the remedy could not overtake it when in such deadly quantity. Further, he asserts that the permanganate is a chemical antidote, and not a physiological one, that contact, and speedy contact, is therefore necessary. He reasserts the conclusions drawn from his numerous experiments. He might have added that injecting the venom into one saphena vein, and the antidote into the other, unnecessarily increased the danger of absorption, and that a one per cent. solution of the salt was too feeble as against the concentrated venom employed. In short, the experiments seem rather to have been planned to produce a failure, and their negative results cannot be set against the positive success of Lacerda, and that of Richards and many others, with the more deadly cobra poison.

The records of scientific research afford many surprising instances of contemporaneous discovery—discoveries with identical results, made at nearly the same time by independent observers. About the time that Lacerda was experimenting with the venom of the bothrops in Brazil, Dr. Armand Gantier, of Paris, arrived at very similar conclusions as to the neutralizing power of caustic potassa in relation to cobra or rattlesnake venom. His communication upon the subject was read at a meeting of the Academy of Medicine, July 26, 1881.² Lacerda's paper was presented to the Academy of Sciences September 2, but as it was sent from Brazil, it is clear that the two investigators arrived at similar conclusions about the same time.

¹ O permanganato de potassa contra a mordedura de cobras. *Gaz. med. de Bahia*, 1882, 2 s. VI., 550-559.

² *Bull. Acad. de méd. Par.*, 1881, 2e sér., X., 779; 948.

Gautier's experiments with serpent venom arose during his researches into the nature of the ptomaines. A word or two of explanation as to the nature of these substances may be necessary. Ten years ago, Selmi, of Bologna, discovered in a cadaver certain alkaloids closely resembling the well-known vegetable alkaloids, such as aconitine, veratrine, morphine, and others. These new bodies were the products of putrefaction, and he called them ptomaines, from *πτῶμα*, a carcass. Strange to say, nearly about the same time, Gautier also discovered these alkaloids to be developed in putrefied blood. Further investigations have shown that ptomaines are also found in the living body, and they have been discovered in the urine of fever patients, in healthy urine, saliva, blood, muscular juice, in the serum of ovarian cysts, in the amniotic fluid, and in some other animal fluids.

When it is remembered that these ptomaines are violent poisons, that they respond to reagents just as the poisonous vegetable alkaloids do, differing only in the *velocity* with which the reducing power is exerted, that they are produced in certain morbid states of the living body, and are generated by putrefaction in the cadaver, we must admit the enormous importance of the discovery in its relation to medical jurisprudence. Brouardel speaks of it as the "sword of Damocles" hanging over the head of the expert in toxicology.

Time will not admit of more than this mere mention of the subject, but its relation to serpent-venom remains to be told. Gautier obtained from healthy saliva sufficient ptomaine to destroy birds. The saliva was procured direct from the duct of the parotid gland, so that it was uncontaminated by the impurities of the mouth. The points of resemblance of serpent-venom to the new alkaloids are as follows: they are not ferments; heat long applied leaves them both nearly as deadly as before. Gautier boiled the serpent-venom, filtered it, and evaporated it to dryness; still, when dissolved in water or glycerine, it would destroy life. He exposed it to a temperature of 125° C. for several hours, without diminishing its potency. The toxic effect upon animals is the same with both. At first is observed restlessness, then rapid breathing, coma, paralysis, convulsions, and death with the heart in systole. After death, the muscles do not contract under the stimulus of the electric current. Professor Corona¹ says the loss of muscular contractibility is produced by none of the vegetable alkaloids excepting muscarine, the active principle of poisonous fungi, which strongly resembles the ptomaines in its effects. Both serpent venom and ptomaines respond alike to chemical tests, and have the same reducing power. A singular peculiarity has been observed in both of them, that the gastric juice increases their virulence, while the admixture of bile diminishes it.

¹ Gianetti e Corona. Sugli alealoidi cadavericio ptomaine del Selmi. Memoria letta all' Accad. di Sassari, XIX. Adunanza, 1880.

In the course of his experiments, Gautier found that the injection of a solution of caustic potassa into the veins or tissue, in combination with cobra venom, made the poison innocuous. When it is remembered that the permanganate of potassium is soon decomposed in the blood, and caustic potassa remains, the identity of the discovery and conclusions with those of Lacerda is evident and remarkable.

Dr. Corre, of the French Navy, some time since gave an account of the symptoms produced by certain poisonous fishes in tropical countries, and they strongly resemble the effects just described, of ptomaines and serpent poison. M. Remy finds that the genital organs, the ovaries, and the testicles, are the poisonous parts. A bouilli made from them and injected under the skin of two dogs produced death, while the other parts of the fish proved to be inert.¹

Before leaving the subject of the ptomaines, I wish to draw attention to a passage in Dr. Weir Mitchell's account of his experiments with rattlesnake venom, published in 1868.² He said: "The one form of poison which most resembles venom is that of putrefactive substances, and I am inclined to think that from putrefying material may yet be separated a substance, which, concentrated, will prove active toxically, and will, perhaps, enable the observer to repeat the facts I have witnessed here." This prediction was made in 1868, three years before Selmi made known his discovery of the cadaveric alkaloids.

The ptomaine theory would be incomplete without reference to another pathological process in which the omnipresent bacteria figure. It is believed by Gautier, Le Bon, Dr. Ogston, of Edinburgh, and others, that these micro-organisms, when in large quantities, engender ptomaines.

They argue that when a small inoculation is made into the tissues—for it must be understood that this form of the germ-theory involves tissue-poisoning rather than blood-poisoning—the blood acting only as the carrier—a rapid increase of micrococci takes place, with local irritation and subsequent pyæmia. If a larger quantity of the poisonous fluid be injected, ptomaines are developed in proportionate amount, and a fatal result rapidly follows.

It cannot be said that the development of ptomaines from micrococci, or of the latter from the former, for both views have been maintained, is anything more than a hypothesis—proofs are, as yet, wanting. But, all theory apart, there is no doubt as to the fact that, while inoculation of serpent-venom or animal-poison into the blood or tissues, in large quantity, or of a specially virulent quality, will produce rapid death by paralysis of the nerve-centres, smaller injections, or of a less virulent material, will pro-

¹ Note sur les poisons toxiques du Japon. Comptes rendus Soc. de biologie, 1883, iv. 263.

² Experimental Contributions, etc., p. 23.

duce great local irritation and even gangrene, followed by septicæmia and probably death.

There appears to be some similarity to the latter process in the action of the *sui*, or needle-poison, of India.¹ The seeds of the *Abrus precatorius*, known as *rati* or *gunchi* seeds, are used as an article of food in times of scarcity, but if the powdered seed, even in small quantity, be injected into the cellular tissue, it produces inevitably fatal effects. The *chamars*, or skinners, as they are called, robbers who steal or destroy cattle in order to sell the hides, make the powder into a paste, and form from it the *sui*, or needle, which is a spike about three-quarters of an inch in length, resembling a cock's spur. It becomes very hard and sharp when dry, and, having been inserted into a wooden handle, it is driven by a forcible blow into the skin of the animal. Some instances have recently occurred of its fatal use on human beings, and the composition of the *sui* poison has been made the subject of official investigation. At one time it was supposed to be dried serpent venom, but its effects are different. There is neither paralysis, difficult respiration, convulsions, or coma, as in acute serpent-poisoning. As the *sui* liquifies, it produces intense cellulitis, with inflammation of the lymphatics, and, as it slowly finds its way into the circulation, great depression of the vital powers ensues, ending in death. Extreme weakness with local swellings are the only symptoms. Two dogs, which were experimented upon with it, died, the one in 49, and the other in 55 hours. It is very probable that when a competent observer investigates these cases, he will find the tissues and fluids of the poisoned animal swarming with bacteria.

It is not within the scope of this paper to relate the results obtained with the various remedies for serpent poison, except in connection with recent experiments, but a few words must be said as to the value of ammonia injected into the veins or tissues. The evidence in regard to this remedy is contradictory and puzzling.

Professor George B. Halford,² of the University of Melbourne, has recorded many cases, observed by himself and others, in which the use of ammonia seemed wonderfully successful. His experiments upon animals were made with the venom of the tiger-snake (*Hoplocephalus curtus*). It has been objected that the bite of Australian serpents is not generally dangerous. Sir Joseph Fayrer, and other Indian observers, have found ammonia entirely worthless as an antidote to cobra-poison. Dr. Weir Mitchell states that it has no value as a chemical antidote, and as a stimulant it is far inferior to alcohol. Professor Halford asserts that serpent venom produces an enormous increase of the white corpuscles of the blood, and he attributes this to a germinal matter consisting of nuclei $\frac{1}{1000}$ inch

¹ Indian Med. Gaz., Calcutta, 1882, xvii. 287.

² The Treatment of Snake-bites in Victoria, Melbourne, 1870, 8vo.

in diameter, proceeding from the serpent's glands. Dr. Weir Mitchell's views are quite adverse to this belief. Prof. Halford further insists that death from snake-bite is due to deoxidation of the blood, the addition of the germinal matter from the venom, in some unknown manner, destroying its power of absorption of oxygen. He asserts that the blood of poisoned animals will, after death, speedily absorb oxygen to a much larger extent than unpoisoned blood.

A case has recently been reported in which the new remedy, jaborandi, was employed with success in a case of snake-bite.¹ Profuse salivation and perspiration was produced, followed by the subsidence of the dangerous symptoms.

Dr. Weir Mitchell has again entered the field of experiment, but this time his investigations have been made with the assistance of Dr. Edward Reichert,² upon the venom of the Gila monster, the *Heloderma suspectum*. This is the only member of the lizard family which is, as yet, known to be poisonous. Last November a specimen which was in the Smithsonian Institution, while being examined by Dr. Shufeldt, bit him in the thumb, inflicting a severe, lacerated wound. The doctor sucked the wound until bleeding ceased, but the hand began to swell, and such severe pain shot up the arm and down the corresponding side, that he fell fainting to the ground. A sleepless night followed, but in a few days the wound healed entirely. The same lizard was sent to Dr. Mitchell, who obtained its saliva by forcing it to bite a saucer, into which the secretion dribbled. The saliva had a faint, aromatic odour, and was distinctly alkaline, in contrast to serpent-venoms, which are all acid.

About four minims of this saliva, diluted with half a c. c. of water, was thrown into the breast muscles of a large, strong pigeon. In three minutes he began to rock on his feet, respiration became rapid, short, and then feeble, convulsions with dilated pupils followed, and before the end of the seventh minute, the bird was dead. In another experiment, in which one-sixth of a grain was injected into the carotid artery of a rabbit, the animal died in nineteen minutes; and, in another case, death ensued in a minute and thirty-five seconds. After many other tests of its virulence, Dr. Mitchell comes to the following conclusions: The poison of *Heloderma* causes no local injury; it arrests the heart in diastole, the organ contracting slowly after; the heart loses its irritability to electric stimuli at the time it ceases to beat; the other muscles and nerves respond readily to irritants; the spinal cord has its power annihilated abruptly, and refuses to respond to the most powerful electric currents.

¹ Morsure de vipère; accidents graves; emploi du jaborandi; guérison. Gaz. hebdomadaire de médecine et de chirurgie, Paris, 1882, 2e série, xix. 835.

² A partial study of the poison of *Heloderma suspectum* (Cope), the Gila monster. By S. Weir Mitchell and Edward T. Reichert. Medical News, Phila. 1883, xlii. 209-212. Also, Reprint.

This interesting and virulent heart-poison contrasts strongly with the venoms of serpents, since they give rise to local hemorrhage, and cause death chiefly through failure of the respiration, and not by the heart, unless given in overwhelming doses. They lower muscle and nerve reaction, especially those of the respiratory apparatus, but do not, as a rule, cause extreme and abrupt loss of spinal power.

Dr. Mitchell has made arrangements to have a number of these lizards sent to him in the spring, when he will prosecute his investigations into the nature of their venom. The Gila monster grows to the length of three feet; the specimen which bit Dr. Shufeldt was fourteen inches long.¹

In the *Virginia Medical Monthly* for February, is an article by Dr. Isaac Ott, of Easton, Pennsylvania, entitled: "The Physiological Action of the Venom of the Copperhead Snake—*Trigonoccephalus contortrix*." In Dr. Ott's experiments, the snakes were forced to strike the rabbit or frog, a method, as before stated, lacking in precision. One rabbit died in two hours; another, which had been struck by three copperheads, in eight minutes.

Dr. Ott's principal conclusions are as follows:—

The venom of the copperhead is weaker than that of the rattlesnake.

Both reduce the heart's action, and, in cases of large quantities of venom, death ensues through the heart.

Muscular irritability at time of death is little affected in copperhead poisoning.

The cardiac force, rhythm, and frequency, and the arterial tension are lowered by both venoms.

The blood after copperhead poisoning shows no microscopic changes of its globules, or any difference in its spectrum.

Dr. Ott, like Dr. Mitchell in his experiments with heloderma, made use of the kymographion, and recorded the variations of pulse and arterial tension. Neither of them seems to have made any record of the temperature.

The latest, and from the standpoint of physiological chemistry, the most important addition to our knowledge of the subject is again the work of Dr. Weir Mitchell. At the recent meeting of the National Academy of Science, in this city, Dr. Mitchell read a paper describing the results of some researches made by himself and Dr. Edward T. Reichert,² with the fresh venom of the rattlesnake, copperhead, and mooseasin. The report says: "Our work has resulted in the isolation of three distinct proteid bodies, of which two are soluble in distilled water and one is not. Of the

¹ The bite of the Gila monster (*Heloderma suspectum*, Cope). *Am. Naturalist*, Philada., xvi. 907-9.

² Preliminary Report on the Venoms of Serpents. By S. Weir Mitchell and Edward T. Reichert. (Read before the National Academy of Science, April 18, 1883.) *Med. News*, Philada., 1883, xlii. 469-472. Also, Reprint.

former two, one is incoagulable at a temperature of 100° C. It may be obtained by boiling venom, which throws down or destroys all the other proteids, and then filtering, or by dialysis." This proteid, by a careful series of tests, they decided to be a *peptone*, as it answered in a positive manner to all the tests for that body, and gave three reactions in addition not found in any other peptone. It is the only peptone yet known which constitutes a portion of a secretion, or originates within the living body, except as a product of the digestion of proteids.

The second proteid, after a like careful series of experiments, has been determined to belong to the class of *globulins*. The third proteid has not been thoroughly separated, but it is an *albumen*.

These three substances they term *venom peptone*, *venom globulin*, and *venom albumen*.

The venom peptone is not as poisonous as venom, but produces remarkable local effects. If injected, in a small quantity, into the breast muscles of a pigeon, a lump forms, and within forty-eight hours a gangrenous cavity is formed giving off horrible putrefactive odours. The venom globulin is of intense virulence. One-twentieth of a grain will kill a large pigeon in two hours. It is not yet known whether the venom albumen is poisonous. The power of the venom peptone to produce putrefaction in the tissues is most surprising. The venom globulin produces rapid extravasation of blood in the tissues.

The crotalus, whose venom was thus analyzed, was the *C. adamanteus*, or diamond-back rattlesnake. In his former experiments, Dr. Mitchell employed the *C. durissus*, and he has made a singular discovery, namely, that while the venom of *C. durissus* was scarcely at all impaired by boiling, yet the toxicity of *C. adamanteus* was destroyed by a temperature of 176° F. The report states, also, that the poisons of the rattlesnake, the copperhead, and the moccasin can be destroyed by bromine, iodine, bromohydric acid, sodium hydrate, potassium hydrate, and potassium permanganate. This discovery of the separation of venom requires a long and elaborate series of researches to thoroughly elucidate it.

With this abstract of the extremely important discovery of Drs. Mitchell and Reichert terminates this account of recent experiments on serpent venom.

It will be observed that, in some instances, the conclusions of these investigators seem to be antagonistic, and the remedies, which are all powerful in the hands of some, appear to fail in those of others. Still, great progress has been made in determining the mode of action of venom and defining its chemistry, and a reasonable hope seems permissible that a chemical antidote has been discovered which may save many lives.

ARTICLE XIII.

EXTENSIVE INTERLOBULAR EMPHYSEMA AND ABSCESS OF THE LUNG, AFTER WHOOPING-COUGH, IN A CHILD OF TWO MONTHS.—UNIQUE CASE. By WILLIAM P. NORTHROP, M.D., Pathologist to the New York Foundling Asylum.

PATIENT is a female, aged two months, New York Foundling Asylum. She was brought to the asylum and "given up" when one month old. Her "condition" at that time was recorded as "poor." Three days after entrance she was put out to wet-nurse in the city. Was returned in eight days by the nurse because she was "sick and cross."

From this time she was bottle-fed. She was found to be suffering from whooping-cough and diarrhoea. She gradually fell into that condition well named "marasmus," and died, aged two months, having been under observation one month.

Dr. Geo. M. Swift, house physician, states that the notable feature of this case, to distinguish it from numerous other unfortunate "marasmus babies," was its severe paroxysms of coughing, accompanied with a well-marked whoop.

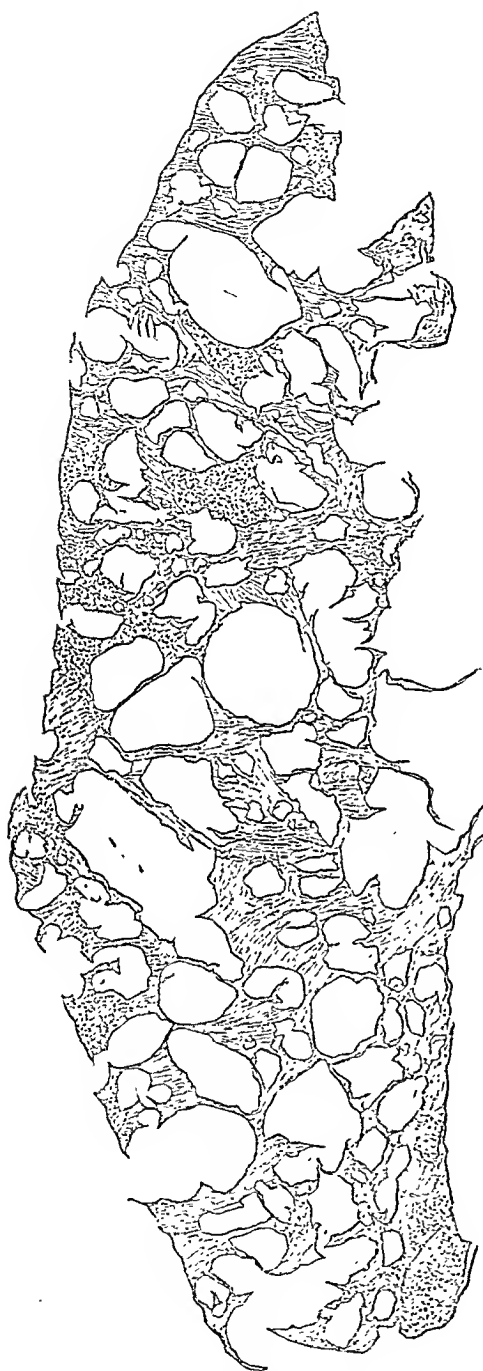
Autopsy, Oct. 27, 1882, twelve hours after death.—*Body*, emaciated, abdomen sunken and greenish stained, excoriations about anus and buttocks. *Brain*, not examined. *Lungs*, bronchial glands somewhat enlarged, firm. Left, small area of consolidation along the posterior portion. Few scattered spots of interstitial emphysema in upper lobe and along the anterior lip of both upper and lower. These spots appear like rows of air bubbles, those at the lip assuming larger dimensions, and looking like elongated sacs. These sacs run upward toward the root of the lung, between the lobules, for an inch or more. Right, does not retract on opening the thorax. Red hepatization of nearly the whole of the lower and middle lobes. The surface of the upper lobe has an opaque, grayish, parchment-like appearance, irregularly nodulated as though composed of many variously sized air sacs crowded together.

On section the upper lobe shows a labyrinth of communicating cavities varying in size from a pea to a filbert. The partitions are in places, obviously, compressed lung tissue; again fibrous bands, which, becoming thinner and thinner, either stretch across cavities or are discontinued. The colour is the same dull, brownish, opaque throughout.

In the middle lobe the departure from normal is less marked. The lobules are compressed and pneumonic, the interlobular spaces being on an average equal in size to the compressed lobules.

In the lower portion of the lower lobe it is still less marked. There is a liberal sprinkling of spherical cavities, half the size of a lentil; and besides this, a checking off of the lobules, so that a majority of the lobules are separated from their neighbours on one or more sides by a narrow interlobular fissure. No emphysema of mediastinum nor surrounding tissues.

Heart, normal. *Liver*, size normal, colour dark, vessels filled with dark fluid blood. Gall-bladder distended with bile, ducts pervious. *Spleen*, size normal, colour dark. *Kidneys*, urates in tubules, size and markings normal. *Stomach*, post-mortem softening. *Intestines*, mesenteric glands enlarged uniformly throughout. Whole abdominal cavity has a greenish washed-out appearance. Small, contents tenacious, greenish mucus. Mucous membrane gray and sodden. Peyer's patches



Interlobular emphysema; transverse section of upper lobe. Enlarged one diameter.

dilated canals, which from their course and from the structure of their walls, seem to be lymph vessels. These can be traced down into the interlobular tissue in several cuts.

not prominent. Large, contents mucus and flakes of yellowish material. Membrane gray and sodden. Solitary follicles pigmented.

Microscopic Appearances.

—To describe the lesions in order of prominence:—

First. Interlobular emphysema. At the angles of junction of the partitions above described, there are to be seen compressed air vesicles. Even this likeness to normal lung is of rare occurrence in the upper half of the upper lobe. Removed from the angles the tissues are more and more compressed laterally till there remains simply a band of connective tissue.

Second. Along the lower border of the upper, and throughout the middle and most of the lower lobes there exist interlobular spaces and pneumonia together. The pneumonia is characterized by an excess of pus. The bronchi and cells walls are extensively infiltrated with it, while in many of the alveoli no epithelial elements are found, and little or no fibrin.

Third. In this portion of the lung there exists a peculiar condition. Many of the interlobular spaces are filled with pus and fibrin in varying proportions. These lakes of pus are large enough to be seen by the unaided eye in an ordinary section. Besides these lakes of pus there are beginning abscesses from breaking down of lung tissue.

Fourth. Dilated lymph spaces beneath the pleura. In the subpleural tissue there are seen tortuous, irregularly

Fifth. Ordinary recent broncho-pneumonia. This is most abundant in lower lobe and skirting the lesions mentioned above.

Sixth. Last and least, a few patches of normal lung in the lower lobe.

We have then a case of extensive interlobular emphysema occurring in, and probably due to, severe whooping-cough. Complicating this is suppurative interstitial inflammation. The latter process was certainly advancing at the time of death.

All modern authors speak in a general way of the possibility of interlobular emphysema as result of whooping-cough.

After a long and careful search, the writer is unable to find anywhere in the literature of emphysema the record of a case similar to the present. Many are reported of sudden emphysema, showing in the neck, and some, in which on autopsy, emphysema of the mediastina was found.

ARTICLE XIV.

AN ANOMALY OF THE HUMAN HEART. By H. HORACE GRANT, A.M., M.D.,
Lecturer on Operative and Minor Surgery, and late Demonstrator of Anatomy,
Kentucky School of Medicine, Louisville.

I HAVE to report an anomaly in the human anatomy, interesting not alone from its striking singularity, but as well from its clinical importance. Almost without exception irregularities in the arterial system affect but little the sovereignty of the general circulation, the provisions of nature offering always a compensating arrangement in the notable variations from the standard. The present instance, however, is an example of grave and fatal changes resulting from an unsuspected congenital lesion.

In June, 1880, I was invited by Dr. B. A. Garr to assist him in a post mortem. The subject was a mulatto girl aged 16 years; small stature; poorly developed; family history was unknown. Of her illness the doctor gave the following history:—

She had been under his observation for a year. She presented during all that time a loud, regurgitant murmur at the tricuspid orifice, increased præcordial dulness, and an irregular pulse; she had experienced several attacks of hæmoptysis, and had harassing cough; she had never menstruated; her fingers and toes were clubbed to absolute deformity. All during the doctor's observation of her she had laboured under marked dyspnoea; but never presented any pulmonary dulness on percussion, nor any constant râles. It was made out from the family that most of these characteristics had existed since birth in a greater or less degree.

Dr. Garr had arrived at a diagnosis of tricuspid insufficiency, and probable dilatation of the right heart. He referred the hæmoptysis to pulmonary congestion.

Upon removal of the sternum and pleura, the lungs were disclosed in a marked condition of pulmonary apoplexy. A great number of hard, blue-black lumps, representing clotted blood (some of them partially organized, seemingly), were found in the air-cells and in the interstitia

tissue. These lumps, which, pathologically, are of more than passing interest, were chiefly upon or near the surface; in no instance were they larger than a small cherry, and for the most part smaller, quite irregular, and invariably beneath, not only the visceral pleura, but within the cellular tissue of the lung itself; no tubercle was found; no abscess; no pus. As our chief search was directed to the heart, after cutting through the aorta above the pericardial attachment, and severing the pulmonary vessels at the root of the lungs, we took the heart away with us to examine it at our leisure. With the assistance of Dr. Geo. J. Cook, late Professor of Anatomy in the Kentucky School of Medicine, we examined the right auricle, which was found largely dilated; the right auriculo-ventricular valve was insufficient, and had permitted of very considerable regurgitation; the ventricle upon being opened was also found somewhat dilated. But we were very greatly astonished to find upon further investigation, that cavity communicating directly with the aorta; no pulmonary artery was to be seen attached to the heart; the left auricle was normal; the mitral valve perfect; the left walls and cavity natural in texture and size, but presented only one-half the usual attachment of the aorta. In a word, both ventricles opened with equal freedom into the aorta. One semilunar valve attaching to the opening from the right ventricle, one from the left, and one from the posterior ventricular septum; the aortic sinuses were as usual, and the valves perfect; however, both coronary arteries arose out of the right ventricle's sinus of Valsalva; the heart was empty. In our search for the pulmonary artery we found at the pericardial attachment to the aorta two arteries given off, each about one-fourth of an inch in diameter; they passed right and left backward from the front of the aorta; evidently, and beyond question, they supplied the blood to the lungs. We could not, of course, trace them, since not expecting to find an anomaly like this we were not careful at the autopsy where we cut the vessels leading to the lungs. Of course, there was no ductus arteriosus.

In this instance we had a heart acting for sixteen years almost identically as when the Eustachian valve remains pervious. Here was a mixed current of blood thrown continually into the general circulation. The natural dusky hue of the skin obscured the cyanosis which doubtless existed. The tricuspid insufficiency was, as is usual with such lesions, probably congenital. It is not difficult to explain most of the symptoms and signs; mal-nutrition and carbonic-acid poisoning, on account of the unarterialized blood, retarded development and disturbed function. So unusual a clubbed condition of the fingers and toes may be explained by similar reasoning, such pathological anatomy frequently accompanying valvular diseases of the heart. The hæmoptysis doubtless was from pulmonary congestion; but the causation of passive pulmonary congestion, and of pulmonary apoplexy has always been referred either to stagnation or obstruction of the venous current from the lungs. Authorities ascribe it either to feeble *vis a tergo* from dilated right ventricle, or else disease of the mitral valve, allowing regurgitation and obstructing the flow from pulmonary veins. Certainly this congestion was not active, as the hemorrhages had been irregularly occurring for several years, not occasioning at any time any unusual or pronounced change in the health of the child. The marked differences presented by the clots declared against the possi-

bility of the hemorrhagic effusion occurring at one time only; evidently it was frequently repeated. It is clear, too, that in this case no obstruction to the return of the venous current existed; the prompt evacuation of the heart favoured really the pulmonary efferent flow. It is a question whether this pulmonary apoplexy was really the result of stasis in the pulmonary circulation, or whether the etiology may not have relation to the great *vis a tergo*, of two ventricles forcing the blood into the pulmonary capillaries. If, as is conceded, cardiac hypertrophy may cause active pulmonary congestion, may not the concentrated power of both sides of the heart rupture a pulmonary capillary and produce extravasation in the lung-substance, inducing at times hæmoptysis?

It may be out of place to consider at any length in this article the pathological relations, my object being only to report the anomaly. Still, if there be reason to suppose the force of the heart may rupture the capillary walls, a new significance is added to simple hypertrophy of the heart.

It is astonishing that the child should have lived so long, nourished from birth by blood not more than, if so much as, half oxygenized. The diagnosis of such a condition during life is, of course, out of the question; and, indeed, it is doubtful if a parallel case exists in the annals of medicine. The specimen has been examined by many anatomists, among others Dr. J. M. Holloway, Professor of Surgery, and Dr. J. M. Matthews, Professor of Pathology, in the Kentucky School of Medicine, and is at present in the museum of that institution.

ARTICLE XV.

STATISTICS OF 272 LITHOTOMY OPERATIONS. By NISHAN ALTOUNIAN, M.D., of Turkey in Asia. Translated from the Armenian by his son MELKAN Z. ALTOUNIAN, M.D. (Jefferson Medical College).

THE 272 lithotomy operations, the statistics of which are given below, have been performed since 1860. The weight of the calculi varied from $\frac{1}{2}$ to 89 drachms. Of the 272 cases, 75 were at the time of the operation, with the exception of the vesical trouble, healthy. The age of the patients varied from 1 to 80 years.

Summary of Operations.—Of the whole number of operations, there were lateral 64, died 5; medio-lateral 167, with 7 deaths; median 36, 2 deaths; medio-bilateral 5, death 1. As to the composition of the calculi, there were urates 119, with 3 deaths; phosphatic 71, and 7 deaths; unphosphatic 40, no deaths; oxalate 42, with 5 deaths.

As regards age, there were between 1 and 10 years 47 cases, with 1 death; between 10 and 20 years, 99 cases, 4 deaths; 20 and 30, 66 cases and 2 deaths; 30 and 40, 38 cases and 2 deaths; 40 and 50, 23 cases and 4 deaths; 50 and 60 years, 6 cases, no death; 60 and 80, 3 cases, 2 deaths.

In 4 cases the calculus was adherent; in 1 case a perineal fistula remained after the operation; secondary hemorrhage occurred in 15 cases, peritonitis in 11, cellulitis in 10, cystitis in 37, and erysipelas in 9.

Methods of Treatment.—Cases which were in a healthy condition were never put under preparatory treatment; those suffering from organic diseases or complications, which might militate against recovery, were put under preparatory treatment. At the time of operation the bladder was allowed to retain its urine, or water was injected. The bladder should contain from 2 to 12 ounces of fluid according to its capacity and the age of the patient. If the bladder be not distended, there may be difficulty in seizing the stone, especially when it is small, but when it contains a considerable quantity of fluid, wounding of the tissues is thereby often prevented during division of the deeper structures; besides, the gush of fluid forces the stone forward to the neck of the bladder within easy reach.

Chloroform was the anæsthetic used, except in those cases in which it would obviously have been disadvantageous. The patients were allowed to remain under the anæsthetic only for a short time, and were never thoroughly influenced by it.

In cases of arterial hemorrhage, the ligature was always resorted to; if there was very free oozing, hot or cold water was applied, hot water being found more advantageous. No attention was paid to slight oozing. Styptics were not used, it being found that, in the majority of cases, they do more harm than good, often causing an inflammatory condition.

In removing the stone no attempt was made to enlarge the opening by force, gentle traction being all that is required; in some cases, where the opening was not large enough, the knife was used, the neck of the bladder being divided laterally.

At present the medio-lateral operation is preferred, especially in children, in whom the recto-pubic space is short. A stone as large as a hen's egg—even larger—is extracted without any difficulty by the medio-lateral operation; in fact three stones, each nearly as large as a goose egg, have been removed by this operation. When the stone is smaller, and there is a roomy perineum, the median operation is more often used.

The median operation is preferable, however, as giving more room for the extraction of the stone; and the cases are less subject to the inflammatory conditions, so often met with in the other operations, often causing retention of urine, especially in cases of pelvic deformity.

After Treatment.—On the day of the operation large doses of morphia or opium are administered every three or four hours; smaller doses on the second and third days. It is then discontinued, unless an inflammatory condition of the parts arises, in which case one dose is administered at night. The perspiratory secretion is kept up by a mixture of gum-arabic and cherry laurel water, and some diaphoretic. On the fourth day a dose of castor oil is given, and afterward, tonics and nutritious diet.

Plethoric patients, in whom febrile symptoms arise, are bled; anæmic

patients are ordered quinine with opium or morphine in small quantities.

Should the wound become inflamed, warm linseed cataplasms are applied, with lotions of opium and lead-water. When there is supra-pubic tenderness or pain, warm cataplasms are used along with constitutional remedies. In cases with high fever, quinine is the remedy, especially in anæmic subjects. Bleeding is preferable in strong plethoric subjects.

It is of great importance that the external wound be kept clean. During the first four days it is washed with warm water. The urine is closely watched, as too great acidity or alkalinity retards the healing process. The great requisites in lithotomy are a sharp knife, a quick hand, and an accurate cut. The whole operation was generally performed in two minutes; cases of the median operation rarely took five.

ARTICLE XVI.

THE RADICAL CURE OF VARICOCELE. By H. LAWRENCE JENCKES, M.D.,
of Glen Haven, Wisconsin.

THE object of this paper is to present in a concise form the operative treatment for the cure of varicose conditions of the spermatic veins, by means of a clasp, known as "Williams's Varix Clasp." The idea of continuous instrumental pressure is not new. It is mentioned in *Pancoast's Surgery*, published some thirty years ago. In the second edition of *Curling on Diseases of the Testis* (page 366) is a cut representing an instrument by which pressure may be continuously applied. Several cases are there recorded in which the time required for cure varied from seven to fifteen months. In the *Chicago Medical Journal and Examiner* for May, 1879, an article on this subject appears, by T. W. Williams, M.D., describing an instrument by which continuous local pressure may be applied. In that article (page 471) he states that in about 200 cases the operation was successful in 98 per cent., and that none died. This, certainly is a result surpassing any other for the treatment of this disease.

In mild cases, commonly met with, all the treatment necessary is measures which will well support the testicles—the suspensory bandage. In cases of a severe nature, where operative procedure is resorted to, the object in all cases is the same—that of occlusion of the lumen of veins. The radical treatment consists in the obliteration of these veins by the ligature, the knife, the cautery, or by compression between the blades of a clasp. Division and excision, as Stimson in his *Manual of Operative Surgery* says, "are unsafe, even when the veins are compressed above and below by harelip pins and twisted sutures." Sir Benjamin Brodie, Sir Everard Home, and Delpech, recommended and used the ligatures. Delpech having operated for a double varicocele, a year afterwards was

assassinated by the patient. Upon the death of the assassin his testicles were found atrophied. Atrophy and phlebitis are not the only objections to the ligature. It is exhercuiatingly painful, and, as Dr. Gross says, "pain is a great evil."

In the second edition of *Curling on Diseases of the Testis* (page 359) I find in a note: "I have been informed that several patients, whose spermatic veins were tied by Roux of Paris for the cure of varicocele, died from the operation." Now, any method which the surgeon can devise, by which the dangers of the operation are lessened—by which the pain is so slight as in some cases to require but a single anodyne, by which the time that the patient is obliged to keep his room does not exceed ten days—seems greatly preferable to the operations recommended in the text-books.

The objections to subcutaneous ligation are the difficulties experienced in tightening the loop, and the time required for it to cut its way through. Ricord's method, as simplified and improved by Dr. Gross, is considered safe; but the operation is painful, and phlebitis occasionally results. The radical cure, as effected by the varix clasp, is the occlusion of the veins by continuous instrumental pressure. In applying the instrument, separate the spermatic artery and *vas deferens* from the lumen of veins, and with a tenotomy knife puncture the anterior of the scrotum an inch above the testicle; in this puncture insert the pin at the end of the blade. As the instrument is held in position, an assistant by turning a thumb-screw forces the blades firmly upon the veins. The pin at the end of the blade prevents the veins from slipping from the grasp of the instrument, the blades of which can be compressed to within one-sixteenth of an inch of each other. The pain produced by the pressure is of a dull, aching character, and for the first hour after the application of the instrument is most severe. At the end of that time the blades should again be so tightened as to thoroughly occlude the veins. An anodyne should be now administered, and if required may be given every evening; although, in a recent application of the instrument upon a large varicocele, one opiate was all that was required. The instrument as effectually occludes the veins as though they were encircled by a ligature, while the suppuration caused by the latter is avoided. The pressure should be continued four or five days, and at the expiration of that time, should much œdema of the scrotum follow the removal of the instrument, a flaxseed poultice will hasten its absorption. During treatment the recumbent position should be kept by the patient. As Dr. Williams says: "Owing to the rapidity of the cure and freedom from internal suppuration, the dangers and inconveniences of the ligature are avoided."

From these observations and the experience I have had with the clasp, I consider this superior to any other operative procedure for the cure of the majority of varicoceles occurring in hospital or private practice. Its simplicity, its freedom from danger and pain, and its success, render this operation preferable to any other for the radical cure of varicocele.

REVIEWS.

ART. XVII.—*The Medical and Surgical History of the War of the Rebellion.* Part III., Vol. II. *Surgical History.* Prepared under the direction of JOSEPH K. BARNES, Surgeon-General United States Army. By GEORGE A. OTIS, Surgeon U. S. A., and D. L. HUNTINGTON, Surgeon U. S. A. 4to. pp. xii., 986, xxix. Government Printing Office, Washington, 1883.

THE completion of this third surgical volume will be a matter of congratulation to all who are interested in military surgery. It has been eagerly looked for by the profession ever since the issuing of the first circulars from the Surgeon-General's office gave warning of what might be expected from the material placed within its reach. How well that material has been utilized the predecessors of this volume have attested. Planned upon the same lines, carried on with the same command of material, and of the same sources of supply, although directed by another hand, this volume is in no whit behind those which have gone before. The death of Dr. Otis, so widely regretted, required that another should assume the direction, and to Dr. Huntington has been granted the honour of completing what Dr. Otis had planned.

Dr. Huntington is both generous and modest in relation to his own connection with this volume, and it is pleasant to be able to add that he has well done the work committed to his care.

Some portions of this volume seem very familiar from the fact that circulars Nos. 2 and 7 have in part gone over the same ground, but the subjects treated of in those publications have been carefully reviewed, additional cases have been added, and the successful results traced through a longer series of years.

The work consists of six chapters, beginning with X. and ending with XV. We shall attempt at least a partial analysis of each of these chapters for the benefit of those of our readers who may not find the volumes accessible.

Based upon 89,528 cases, Chapter X. treats of Wounds of the Lower Extremities. Of this large number, 59,376 were flesh wounds, and 30,152 were cases in which the bones were involved. In only 674 of the flesh wounds were they incised or punctured. While the continued reception at the Surgeon-General's office, even at this late day, of reports of cases, makes the actual number an increasing one, it is pointed out that the total aggregates upon which the calculations are based, 253,142 wounds of all kinds, and 89,528 located in the lower extremity, is sufficiently large to establish ratios which are not likely to be disturbed by any increase in the number of cases. It would certainly seem as if the most inveterate statistician might well be satisfied with such figures, and we very much doubt whether any larger collection of gunshot wounds will

disturb the conclusion arrived at in this work, that the ratio borne by wounds of the lower extremities to the whole number is 35.3. The left lower extremity was found to suffer somewhat more frequently than the right.

The magnitude of the materials produced by the War of the Rebellion is shown by the table on page 2, by which it is seen that the total number of wounds reported by individual but reliable authorities as occurring in the Crimean, Italian, Danish, and Franco-German contests, aggregate much less than one-half the number recorded in the Surgeon-General's office in Washington. Of course it is not claimed that this table represents the whole number of wounds received in these wars, but it has been constructed in order to obtain a sufficiently large number of cases, with which to compare the ratio established by our own returns.

Attention is called to the fact that with the progress of the war the proportion of wounds of the lower extremities lessened. This is accounted for by the increased resort to temporary entrenchments, of which experience had proved the value, and which more or less perfectly protected the lower part of the person.

The rarity of bayonet wounds, which was noticed by almost every surgeon who had experience in the matter, is further shown by the fact that the lower extremities were wounded by them but one hundred and seventy-six times.

Shot wounds involving only the soft parts are considered in two classes, those in which large nerves and those in which arterial trunks were injured. But fifty-nine cases are referred to the first category and one hundred and fifty-six to the latter. Many injuries of nerves doubtless escaped report as such, but the absence of remediable wounds of vessels is accounted for by the now established rule, established by experience in the field, that they are of extreme rarity. The conclusions of Dr. Otis on this point, while opposed to expectations which may be quite naturally entertained, are abundantly supported, not only by experience, but by the observations of Heine, Guthrie, and the historian of the Crimean campaign. The mortality in these cases was very large, and Dr. Otis is of the opinion that there was a failure on the part of some surgeons to appreciate the importance of tying both ends of any vessel that has been injured by a shot.

While several interesting instances of the lodgment of missiles in the soft tissues are narrated, none of them equal the somewhat marvellous accounts given by some writers of the size and weight of foreign bodies which became imbedded in the thigh and leg. While Dr. Otis does not directly question the accuracy of these accounts, he evidently inclines to look upon them as apocryphal when said to exist without fractures. Indeed, when Hennen tells at second hand, of the bearers of a dying man complaining that the weight was on one side of the litter, and of a thirty-two pound shot being afterwards cut out of the hip, we hardly wonder at the incredulity of the compiler of this volume.

Dr. Otis next proceeds to the consideration of peri-articular wounds, and differing from M. Legouest, prefers to include in this class those cases in which the capsular ligament has been opened, but in which the osseous tissues are uninjured. Such a classification has some practical advantages, and is supported by other good authorities, as Beck and Fischer. To make a classification dependent upon an accuracy of diagnosis, always difficult, and, as in the case of the hip-joint, well nigh unattainable, seems

very unwise, and we, therefore, think the plan of Dr. Otis much the best. Indeed, so great is the difficulty in connection with this joint, that Dr. Otis speaks of forty-nine cases appearing on the registers in which the reporters *believed* the coxo-femoral articulation to have been opened without direct injury of the bones. Of thirty-five cases where the lesion of the joint was supposed to be primary, twenty-one recovered and fourteen died. In fourteen cases the joint is reported as opened in consequence of secondary traumatic exostitis, seven of which died and seven recovered.

Peri-articular shot wounds of the knee-joint without fracture occurred three hundred and fifty-one times, the joint having been primarily opened in two hundred and fifty-five, and secondarily involved in ninety-six cases. Of three hundred and thirteen cases treated on the expectant plan, two hundred and forty-four recovered, and sixty-nine died. Of the thirty-eight cases in which amputation was resorted to, twenty-nine, or 76.3 per cent. died.

The evidence in regard to the precise nature of the thirty-seven cases reported as peri-articular shot wounds of the ankle-joint is said to be unsatisfactory. In fifteen of the cases no operation was done, and one death resulted; in twenty-two amputation of the leg was resorted to, and twelve fatal results ensued.

The complications of flesh wounds of the lower extremities are then briefly considered. One hundred and ninety-four cases of ligation of large arteries are recorded. In six instances during the war the common iliac was ligated, but in only one did the injury leading to the operation belong to the class now under consideration; the result was fatal. In four cases the external iliac was first tied, and in seven a ligature was secondarily placed upon it after one had been fruitlessly placed upon the femoral. Professor John Ashhurst, Jr., has commented upon the fact, that with the increased number of cases the mortality attending ligation of the large vessels is seen to be larger than was formerly believed to be the case. The compiler of this volume, however, thinks the remark is less applicable to ligations of the external iliac. He refers to the fact that in the extended list prepared by Rabe, in 1875, the death-rate has been advanced but 3 per cent.

One hundred and twenty-seven cases of ligation of the femoral occurring in the war are tabulated. Sixty-two of these operations were in cases in which the vessel was primarily injured, and sixty-five were instances of consecutive involvement of the artery. The serious character of the proceeding is shown by the large mortality which followed its adoption. Ninety-one died, or 71.7 per cent. The profunda alone was twice ligated successfully, and four times unsuccessfully.

For shot flesh wounds amputation was resorted to two hundred and one times, of which one hundred and thirty-one were in the thigh, six at the knee, sixty-three through the leg, and one of the toes. The mortality in thigh-amputations was 71.7 per cent. As is well known, the mortality was less grave in the secondary operations. Of the six disarticulations at the knee but one recovered. In the sixty-three amputations through the leg the mortality was 52.3 per cent. Summaries of these cases are tabulated, which, as in the case of the other tables of this great work, will prove of much value to future students.

Section II. of this chapter is occupied with a consideration of wounds and injury of the hip-joint. It occupies one hundred and eight pages, and is dealt with in a manner commensurate to the gravity and import-

ance of the subject. Inasmuch as circulars No. 7 and 2 of the Surgeon-General's office dealt with this matter in considerable detail, we shall pass over the subject, not because we undervalue its importance, or do not appreciate the admirable manner in which it is discussed in this volume, but on account of the vast amount of material which is still before us, and which we almost despair of being able to compress within the necessarily restricted limits of this review. We will only say that three hundred and eighty-six cases of shot fractures of the hip-joint are recorded in this section, of which three hundred and four were treated by conservation, with two hundred and forty-nine deaths and fifty-five recoveries; fifty-five cases were submitted to excision, with fifty-three deaths and two recoveries; while in twenty-seven cases amputation was resorted to, with twenty-five deaths and two recoveries. Sadly unsatisfactory as such a record is, the observations in recent European wars have shown no better results, and it can only be said that progress in the treatment of this injury is proved by the experience that it is not always fatal, as was once thought to be the case. There is one practical point yet remaining to be settled in the cases of those reported as recoveries after gunshot wound of the hip-joint, namely, the actual amount of injury. There are thought to be fifty such cases still living in this country, and twenty-five are reported by Langenbeck as the result of the Franco-Prussian war. So far, out of those who have since died, no post-mortem examinations are known to have been made. It is to be hoped that as deaths among the remainder occur, exact and minute investigations may be made on this point, thus helping to solve a very important and much mooted question.

Section III. is occupied with a consideration of injuries of the shaft of the femur, all of which were produced by shot. The number of such cases recorded amounts to 6738, of which 3620 were treated expectantly. Although but 2901 were submitted to amputation on account of injury to the femur, the total number of amputations of the thigh recorded in this volume is 6238; the increase being accounted for by the very large number of cases in which the operation was resorted to for injuries sustained by the knee-joint and leg.

One hundred and sixty-two instances of shot contusion of the shaft of the femur are recorded, of which nine were treated by amputation, and one hundred and fifty-three were treated expectantly, with a mortality of 22.8 per cent.. Pyæmia and secondary hemorrhage were the grave complications, and were the principal factors in producing the fatal issue.

Six thousand five hundred and seventy-six shot fractures of the shaft of the femur are next considered, of which three thousand four hundred and sixty-seven were treated by conservation, and three thousand one hundred and nine by operation. Without considering the portion of the femur involved, the treatment by conservation resulted in the recovery of sixteen hundred and eighty-nine, while sixteen hundred and eighty-four, or 49.9 per cent. died. In the six thousand two hundred and twenty-nine cases of thigh amputations, twenty-eight hundred and thirty-nine recovered, and three thousand three hundred and ten died; a mortality of 53.8 per cent. This mortality exceeds the mortality attending conservation 3.9 per cent., but is 15.6 per cent. less than the ratio of deaths following excision of the shaft of the femur, which reached 69.4 per cent. This is a very gratifying evidence of the advance made by modern surgery in a class of cases which a few years back were considered hopeless.

Great care has been exercised by the Surgeon-General's office to follow up these recoveries, and numerous well-executed lithographs present the more or less satisfactory results which have been obtained. The success attending conservative treatment, as also in those cases where operation was resorted to, was of course materially modified by the position of the injury, whether in the upper, middle, or lower third of the femur.

Excisions in the continuity of the shaft of the femur were done one hundred and seventy-five times, but the results were discouraging, and the procedure is not regarded favourably by surgeons either in this country or abroad. Of the cases recorded in this volume, fifty-one recovered, one hundred and sixteen died, making the mortality 69.4 per cent., and in eight the result could not be ascertained.

Proceeding with the consideration of this subject, amputations of the thigh are next treated with great thoroughness, and in much detail. Inasmuch as the operation was resorted to in very many cases of knee-joint and leg injuries, the numbers which the historian has had to deal with are augmented to 6229 cases which have not been before considered. The cases are divided according to location in the upper, middle, and lower third of the bone, and into primary, intermediate, and secondary.

Without reference to locality, three thousand nine hundred and forty-nine amputations were done within forty-eight hours, and are therefore classed as primary, and of this number nineteen hundred and fifty-eight were successful, of forty-eight the result could not be ascertained, and nineteen hundred and forty-three died, a mortality of 49.8 per cent. We shall not attempt to follow the subject into the details as regards location, which are pursued in this section, and the results summarized in numerous tables, further than to say that in the upper third of the thigh amputations had a mortality of 53.8 per cent.; in the middle third of 44.5 per cent.; in the lower third 53.6, while in those where the seat of the operation is unrecorded the mortality was 80.7 per cent. It will be seen that when primary, intermediate, and secondary operations are thus grouped together, the mortality is increased, amounting indeed to 53.8 per cent.

Thirteen hundred and twenty intermediate amputations of the thigh were done, of which four hundred and seventy-nine were successful, and eight hundred and forty-one were fatal, giving the formidable mortality of 63.7 per cent.

There were four hundred and forty-two cases in which amputation of the thigh was resorted to after the thirtieth day from the receipt of the injury, and are therefore styled secondary. Of these, two hundred and thirty-nine recovered, and two hundred and three died, a fatality of 45.9.

Five hundred and eighteen cases of amputation through the thigh are recorded in which the intervals between the injury and the operation are not noted. In all but thirty-two cases the results have been ascertained, and it has been found that one hundred and sixty-three were successful and three hundred and twenty-three died, making the mortality rate 66.4 per cent.

In the total number of 6229 thigh amputations the femur had been fractured in 46.6 per cent.; the knee-joint in 38.5 per cent.; the bones of the leg in 13.8 per cent.; and the ankle-joint or foot in 1.1 per cent.

By Table XLVII. a comparison is possible between the results of thigh amputations in other wars and those done in our own civil conflict. With great labour a collection has been made of nine thousand and seventeen cases from reliable authorities, and the death-rate is seen to be 83.2 per cent.

There is a very judicious and impartial summing up of the results obtained, and the claims for the expediency of conservative treatment are shown to have grown and strengthened of late years. Indeed it would seem as if the attempt to save the limb should be made, when the shot fracture is unaccompanied with injury of the large vessels or nerves, or other serious complication, as affording an equal prospect of preserving life, and sometimes resulting in a useful limb. Especially is this the case when a good, immovable extension apparatus can be applied at once, and be kept on continuously.

The form of amputation adopted varied with the views of the different operators, and a chromo-lithograph pictures six very good stumps obtained by different methods. The flap operation seemed to be most favoured, and it, or some modification of it, was most frequently resorted to. We do not, however, see anything in this section to positively decide as to the respective merits of the two methods. The opinion of Dr. Batwell, contained in the First Surgical Volume, is quoted, in which he condemns the modification by which skin flaps are first made, and the muscles then divided by circular incision. There is, however, an apparently intentional withholding of anything like an authoritative expression of opinion on the part of the historian himself. The same fact is observable as regards any pronounced judgment upon the various forms of dressing employed when conservative measures were adopted. Nothing can exceed the care and pains-taking accuracy which distinguish this most important section.

Twelve punctured, thirty-nine incised, and three thousand three hundred and ninety-eight shot wounds of the knee-joint are considered in Section IV. The punctured wounds all recovered, and there was evidently some doubt on the mind of Dr. Otis, whether some of them at least were not merely periarticular wounds. Seven of them were received from that rather useless weapon, the bayonet. The thirty-nine incised wounds were all produced by axes or hatchets. Thirty-three were treated expectantly, and four of the number died. In six cases, amputation of the thigh became necessary, and all but one died.

Of the shot injuries of the knee-joint, forty-three were recorded as shot contusions, thirty-three of which were treated without operative interference, eleven dying, or 33.3 per cent. and twenty-two recovering. Accurate as this book generally is, there seems to be an error in collecting these cases. For while on page 364 there occurs the statement given above, on the next page we are told that ten cases terminated fatally. Ten cases suffered amputation of the thigh, and eight of the number died.

Of the thirty-three hundred and fifty-five cases of shot fracture of the bones of the knee-joint, eight hundred and sixty-eight were treated upon the expectant plan throughout. The results in nine instances have not been ascertained. Three hundred and thirty-eight were successful, and five hundred and twenty-one fatal, being a mortality of 60.6 per cent.

We cannot pass by the remarkable case which belongs to this category, which is narrated in part in Dr. J. Mason Warren's Surgical Observations. At the battle of Antietam, Lieutenant Baker, 35th Mass., stooping to staunch the flow of blood from a wounded comrade, was himself struck by a ball which passed diagonally through the left elbow-joint, and entering the outer aspect of the left knee-joint, lodged in the outer condyle of the femur. Under judicious expectant treatment he got perfectly well, recovered all the motions of the elbow-joint and all those of the knee

except that of extreme flexion, and engaged in active business until his death, from pneumonia in 1878. After death the bullet was found firmly impacted in the outer condyle of the femur. The articular cartilages were perfectly smooth, there was no channel leading to the ball, nor the slightest evidence of caries existing. The bones entering into both the elbow and knee-joints, with the ball, impacted in the outer condyle for fifteen years, are figured in this volume.

Several other most interesting and remarkable cases will be found narrated under this group.

Excision of the knee-joint for shot injury was done fifty-seven times, and of these forty-four died, and the result in three is unknown, making the mortality 81.4 per cent. The brilliant anticipations of the value of this operation in military surgery, at one time entertained, were not realized. Of one hundred and eighty-nine examples of amputation through the knee-joint for shot injury done to it, the result in two cases could not be ascertained; eighty-one recovered, and one hundred and six died, making the mortality 56.6 per cent., exceeding the fatality attendant upon amputation of the thigh in its continuity either of the lower, middle, or upper third.

The conclusion arrived at by most surgeons, who had much experience in the war of the Rebellion, was, that when the knee-joint received a gunshot wound, amputation in the lower third of the thigh offered the best prospect for saving life, and the experience of later wars is in coincidence with this view. It should be mentioned that while the mortality from amputations through the knee-joint was large, the stumps obtained by the proceeding were satisfactory, and thought to be better adapted for wearing an artificial leg than was the case when the operation was done higher up.

The fifth section of this chapter, containing one hundred and fifty pages, treats of wounds and operations in the leg. Our space will not permit of our doing more than merely to glance at this interesting and important section. The number of cases in which the leg was injured was enormous, nine thousand one hundred and seventy-one instances of shot-wounds involving the bones being entered on the records. One hundred and eighty-three of these are entered as contusions of bone, but the others were all fractures, of which three thousand nine hundred and thirty-eight were treated without operative interference, giving a mortality rate of 13.8 per cent. This is a decided improvement upon the showing made by a series of cases collected from the reports of military surgeons in other wars, which had a mortality of no less than 18.5 per cent. It would appear, however, that while the mortality was small the reports upon the nature of the results made by the pension examiners, from time to time, are by no means such as are to be desired—deformity and diseased tissues being very often the burden of these reports. False joint is only known to have resulted seven times.

The statistics of the war of the Rebellion, and the experience in recent European contests, have pretty much settled the question as regards excisions in the continuity of long bones. Early in the war there was much expected from that measure, and some cases were seen by the writer of this review, but the records of the Surgeon-General's office demonstrate pretty clearly that it should be banished from military surgery, and in the opinion of the writer, from civil surgery as well; deformed and useless limbs are the best results which can be hoped for from what one surgeon most properly terms an "unphilosophical operation."

The amputations of the leg numbered, according to the records, five thousand four hundred and fifty-two; and though the mortality was 32.9 per cent., it compares favourably with that prevailing in other wars. Attention is called to the curious fact that amputations in either the upper or lower thirds of the arm, thigh, and leg, were attended with a higher death-rate than when the middle third was selected. Very little attention was paid by American surgeons to the point of selection, the operation being done at the farthest possible point from the trunk, yet experience seemed to show that amputations in the middle third did better, led to secondary amputations less often, and were more conservative of life, than those done in the lower third.

Section VI. is occupied with a consideration of wounds and operations at the ankle-joint. The experience of the American civil war would seem to confirm the opinion that conservatism was out of place where the injury was of the bones entering into the ankle and involving the joint. Of one thousand seven hundred and eleven such cases, in five hundred and eighteen conservation was practised; in thirty-three, excision was resorted to, and in eleven hundred and sixty-two, amputation through the joint, in the leg, or in the thigh, was had recourse to. The mortality attending conservative treatment was 19.5 per cent., and the ultimate results in many cases less favourable than was at first anticipated. The substitution of excision effected no gain over the results of amputation, so far as saving life was concerned, the mortality in the former being 29.0 per cent., and in the latter 25.1 per cent.

The respective methods of amputating at the ankle-joint, known as those of Syme and Pirogoff, were both practised, the former the most largely. Eighty-three after Syme gave a mortality of 25.6 per cent., while forty-nine after Pirogoff had a death-rate of 28.5 per cent. These numbers are too small to establish what may be regarded as the normal rate of death in these operations, and we are inclined to think that the statistics of the war leave the question as to the comparative merits of the two proceedings unsettled. There seems to be no doubt that Syme's method leaves a stump better adapted for the application of an artificial limb; but while having a lower death-rate, it would seem to be more apt to be followed by reamputation than the method of Pirogoff. The difficulty of getting firm union between the surfaces of the tibia and calcis in the method of Pirogoff is balanced by the proneness of the flaps to slough in that of Syme. The statement made in circular No. 6, upon the authority of the surgeon-in-chief of the Russian navy, Baron von Haurowitz, that Pirogoff had abandoned his method of operating, is said in this volume to be unfounded.

In Section VII., on wounds and operations in the foot, twenty-seven shot contusions, and five thousand eight hundred and thirty-two shot fractures are examined as regards their treatment and results. Here also excisions were not attended with very happy results, and amputations either upon the formal lines of Chopart, Lisfranc, and Hey, or by simply removing the injured parts, were attended with fair success.

In concluding an examination of this chapter, which extends through six hundred and thirty-nine pages, we would express our high estimate of the exhaustive manner in which the work has been done. Not only are the results of the American war examined, but an elaborate attempt has been made to place before the reader those obtained by military experience elsewhere. By these tables it is possible to institute comparisons, and to

observe the later experience gained, bringing the subjects up to the most recent dates. In addition, the previous experience had with especial methods of treatment is summarized at considerable length in the foot-notes, so that the student has placed before him a very complete history of the subject under discussion. The thoroughness with which the ultimate results have been followed out, in very many cases by the diligent use of the facilities possessed by the Pension office, adds immensely to the value of this volume. By the use of such means, it is seen that the end of many cases is quite different from that which was expected at the time they were under the surgeon's hands. In the light of these records, many cases which were discharged with the hope that they would soon cease to suffer inconvenience, are seen to have gone through the tedious and distressing processes, which any one familiar with the surgery of bone has learned to dread.

Chapter XI. is a short one, consisting of two sections. It is based upon 171,565 miscellaneous injuries which were sustained by the troops engaged in the great conflict, estimated at 2,335,942 men. They consisted of burns, scalds, contusions, sprains, dislocations, frostbites, simple and compound fractures, punctured, incised and lacerated wounds. Inasmuch as they did not differ from the injuries occurring in civil practice, there is no attempt made to treat them in the exhaustive manner bestowed upon wounds received from instruments of war. We notice one case of stroke by lightning, on p. 655, in which persistent efforts by artificial respiration and the exhibition of stimulants, were successful in restoring life, although the patient was not seen by the surgeon until ten minutes after the occurrence, and the man was to all appearances dead. The deaths from lightning are by no means rare, but it is unusual for a medical man to be called early enough to accomplish anything. On page 656, there is recorded a case of scorpion bite successfully treated by Bibron's antidote and stimulants. The case occurred in Virginia, and has especial interest in view of Mitchell and Reichert's recent experiments, with bromine as an antidote to serpent venom.

Section II. has to do with the numerous operations done for disease and miscellaneous injuries. The list is quite large and varied. We notice one amputation of the thigh for a carcinomatous tumour in which the exemption from return had continued until the time of issuing this volume, or eighteen years. The microscopical examination was by an undoubted authority, Dr. J. M. Da Costa. Such successes are worthy of especial notice, as they encourage attempts to relieve cases that are hopeless without operation.

Chapter XII. is occupied with a general discussion of wounds and complications. As it is general rather than statistical, it is very interesting, and will probably be more generally read than some others on which much greater labour has been expended. Out of 246,712 cases of wounds by weapons of war but 922, or 0.37 per cent. were produced by sabres or bayonets, and of these by far the greater number occurred as the result of quarrels, or in the discharge of guard duty. This very small percentage is much less than in recent European wars. The introduction of long-range repeating fire-arms would almost seem to have rendered these time-honoured weapons obsolete. Thus we learn that in the by no means infrequent hand-to-hand skirmishes which took place between bodies of cavalry, the carbine and pistol were most generally relied upon, and that very often the sabres were not even sharpened, nor the men instructed in

their proper use. When cavalry were opposed to infantry they were almost invariably at once dismounted and fought on foot.

The proportion of shot wounds of different regions was not found to correspond to the superficial area of the principal divisions of the body as calculated by Longmore. These areas have been found to be as follows, according to careful measurements of the Pythian Apollo and the Farnese Hercules: Head, face, and neck, 8.51 per cent.; trunk, 28.91; upper extremities, 21.14; lower extremities, 41.41. Of the wounds treated in the American war, 10.77 per cent. were of the head, face, and neck, 18.37 of the trunk, 35.71 of the upper extremities, and 35.15 of the lower extremities. Either the uneven nature of the ground on which battles are fought, or the greater or less use of intrenchments must account for the difference found between the theory, and the observed facts. Of course in a large proportion of those struck in the trunk, death occurred on the field, and as the location of such wounds were not considered, it materially affects the proportion.

The character of the different projectiles used is discussed at considerable length, and the variations in the nature of gunshot wounds produced by missiles of rapid velocity are dwelt upon. The appearances of the various missiles are figured and their construction explained with some detail. In the midst of these details, having to do with the sickening ingenuity of man to produce destructive agents, it is refreshing to come across a paragraph stating that the use of "Greek fire" was occasionally resorted to, but that representations of its barbarity led to a discontinuance of it. Reference is also made to the attempt made to discourage the use of explosive bullets, which culminated in the meeting of representatives of European nations at St. Petersburg in 1868, where it was decided to discontinue their use in any wars that might occur between the contracting parties. One hundred and thirty cases of wounds supposed to have been caused by such missiles are recorded, and in some of them there could be no doubt that they had been used. Gardiner's explosive bullets were at one time issued by the Ordinance office in small amount, but more than one-third fell into the hands of the Confederates, and no more seem to have been issued. By a foot note, we learn that in the contest with Chief Joseph's band of Nez Perches Indians, wounds from explosive bullets were observed, and the mystery was explained when it was found that just before the outbreak the Indians had captured the rifles and ammunition of a hunting Englishman. There is no doubt that many wounds produced by missiles of high velocity present such an amount of destruction of tissues as leads to the supposition that explosive bullets have been used.

The injuries caused by large projectiles are referred to and the old theory of "windage" disposed of once more. The instances of cerebral concussion from the bursting of shells near by were not very rare, and the paralysis, deafness, and other nervous symptoms which ensued, were in some instances permanent. A very curious case is given in this connection, in which aneurism of the abdominal aorta was caused by the firing of an 84-pound gun immediately underneath the patient. The prevalence of deafness among artillerymen is well known to be often dependent upon laceration of the membrana tympani. The distortion which leaden bullets undergo when they come in contact with bones and other hard substances is shown in a large lithographic plate, looking very familiar to those of us whose experience reaches back to the sad days of the rebellion. Two coloured

lithographic plates are also given affording very good illustrations of some of the appearances of wounds of entrance and exit.

We are tempted to enliven the dull course of this review by copying the foot-note on page 713, illustrating the contusion which may be produced by a bullet:—

“A soldier found an iron breast-plate, probably thrown aside by some Confederate, on the field at Kingston, N. C., and put it on. He was struck by a Minié-ball on the breast-plate over the region of the third rib and severely contused. He expectorated a full pint of blood and suffered from dyspnœa; the next day he was able to walk about. Since the reception of the wound a round excavation about the size of a Belgian Minié-bullet has sloughed out at the point where he was hit, laying bare the rib. The same breast-plate was worn by another soldier at Whitehall, with less fortunate result. A Minié-ball struck it near its lower border and passed through it, carrying fragments of it into his abdomen, causing death.”

The effects following wounds of nerves are considered at some length, the classical and almost unique work of Drs. Mitchell, Morehouse, and Keen, being very freely quoted from. There are hardly any more unsatisfactory cases than those in which large nerve trunks are cut by shot. Unless there is speedy improvement, the prognosis must be that the symptoms will be very generally more or less permanent, and it would seem as if the character and severity of the symptoms pretty accurately foreshadowed the after history of the case. How sad and hopeless such a history may prove, is well shown in the case of Captain Johnson, who, when 21 years old, had the rectum, and the vessels and nerves which supply the lower extremity, cut by a ball which entered one sacro-sciatic notch and passed out at the other. The wound was received at Jackson, Miss., in May, 1863, and, being taken prisoner, he remained such for seventeen months. He lived until 1878, and, through all those weary years, was obliged to lie upon his face. At the time of his injury, he was in perfect health, six feet and one inch in height, and weighed 200 pounds. Before his death his weight was estimated not to exceed 70 pounds. How much of misery and anguish is represented by the difference! Well did men in those days sing of “when this cruel war is over!”

The effect of missiles upon bloodvessels are considered at a length proportioned to the importance of the subject. Apart from the wounds of large trunks which were speedily fatal, the number of cases of divided arteries was small. A few observations indicate that very many of the “killed” died from hemorrhage, yet but one hundred and eighteen cases are recorded where bleeding occurred from vessels completely divided, and which were within the possibilities of surgical assistance. Of these, thirty-four were attended with primary, and eighty-four with secondary, hemorrhage. Eighty of the cases proved fatal. Three thousand two hundred and forty-five cases of arterial hemorrhage are recorded, and two thousand two hundred and thirty-five of them where the bleeding vessel was definitely ascertained are tabulated, and subjected to careful analysis. One thousand one hundred and fifty-five ligations were done for shot wounds. The common carotid was the seat of ligation eighty-two times, of which nineteen recovered. The external carotid was tied seven times, with four recoveries. The subclavian artery was subjected to ligation in fifty-one cases, with ten recoveries; the axillary forty-nine times, with seven recoveries; the circumflex eighteen times, with eleven recoveries; the brachial one hundred and seventy times, with one hundred and nineteen recoveries. The common iliac was ligated unsuccessfully five times,

and the internal iliae three times with the same result. Six ligations of the gluteal were followed by two recoveries; twenty-six of the external iliae by three recoveries. The femoral was tied three hundred and seventy-four times, and in ninety-four successfully. Of twenty-two ligations of the profunda, five died, and of thirty-six cases, where the popliteal was tied, eight were fatal. The anterior tibial was tied forty-seven times, the posterior tibial forty-eight times, and the peroneal four times, with twenty-six, twenty-nine, and three deaths respectively. Traumatic aneurism occurred in seventy-four cases, with a mortality of 68.9 per cent. Of course the mortality which we have transferred to these pages is but a slight guide to an accurate estimate of the dangers attending arterial injuries. The existing conditions most seriously complicating the results.

Bleeding occurred at various times, but the number of cases very sensibly increased from the fourth to the tenth and eleventh days. No cases where aëupressure was resorted to are reported. Torsion was employed in a few cases, and the actual cautery once. Two cases of transfusion are reported, one of which was successful. Styptics were very commonly used, and, while there is no doubt that they were often resorted to when correct surgery called for other measures, Dr. Huntington thinks that the evidence as to their usefulness is not altogether unfavourable.

Several authorities speak of the rarity with which it is necessary to do a surgical operation to restrain hemorrhage on the battle-field. But a number of such operations were done during the war of the rebellion, and seem to have been quite successful.

One hundred and six cases of hemorrhage from veins are tabulated, in five of which ligation was resorted to. This table shows that wounds of veins were attended with quite as great mortality as were wounds of arteries. From the serious effects attending the few wounds of veins observed, experienced military surgeons suspect that many of the deaths upon the field occur from venous hemorrhage.

Five hundred and five cases of tetanus were observed, being 0.20 per cent. of the injuries by weapons of war. The preponderance of cases in connection with wounds of the lower extremities, which has been remarked upon by Beck, was very marked, two hundred and ninety-two belonging to that class. This is thought by the authors of this volume to be owing to the masses of muscles and soft tissues which interfere with the thorough removal "of foreign bodies and other obnoxious influences." The mortality does not seem to have been high, only reaching 89.3 per cent. The disease made its appearance with the greatest frequency on the eighth day. The treatment was empirical, and nothing was added to our knowledge in this respect by the experience of the war. The coloured troops furnished 2.7 per cent. of the total shot injuries, and 3.1 per cent. of the cases of tetanus.

There existed so much confusion in the minds of many surgeons upon the subject that it has been found impossible to determine with accuracy the cases of traumatic gangrene, hospital gangrene, dry gangrene, etc. All cases of gangrene following shot wounds have therefore been tabulated together, aggregating two thousand six hundred and forty-two, while the various forms are illustrated by examples, or special reports. Especial reports by Drs. Keen, Goldsmith, Brinton, Thomson, and others are valuable contributions to the history of hospital gangrene. Several epidemics appeared from time to time, and much discussion took place as to

the best escharotic. Fuming nitric acid, acid nitrate of mercury, and bromine were all used, and found effective. There was much disposition to laud the latter of these agents especially, and it answered very well; but it has the disadvantage of being very unmanageable, and the irritating character of its fumes makes it difficult to properly inspect its application. With the progress of the war surgeons ceased to dread the disease, as it was found that prompt and thorough local treatment, with isolation of the cases in hospital tents, put an end to its extension.

Traumatic erysipelas was of comparatively infrequent occurrence, only one thousand and ninety-seven cases being recorded in this volume. Quite frequently acute suppuration and diffuse inflammation, or diffuse osteomyelitis were confounded with erysipelas, but such cases have very properly been separated. The observation that erysipelas occurs most frequently in connection with wounds of the head and upper extremity was corroborated by the experience of the American war. The mortality rate of the whole number of cases was 41.0 per cent. In Louisville bromine was used, of course, elsewhere iodine and creasote applications were relied upon, with general sanitary measures. The disease prevailed under the unfavourable conditions which inevitably attend over-crowded wards. Its attendance upon excisions was very marked. No connection between erysipelas and different seasons of the year was observed. It prevailed most when the largest number of wounded were undergoing treatment.

Septicæmia, ichorrhæmia, and the other terms used to describe the various degrees or phases of blood-poisoning are all classed together as pyæmia, so justly dreaded during the war, and, indeed, the great scourge of civil surgical practice. They are grouped together for the sake of convenience, and not with the idea of antagonizing the theories of writers and observers. Septicæmia may show itself before any pus has formed, and therefore cannot be pyæmia, but difference of origin does not alter the grave facts that the vital fluids are depraved, and the result is death. Not that no cases of recovery occur, but they are very few, and can only be regarded as exceptional. Out of two thousand eight hundred and eighteen cases of pyæmia following shot wounds all but seventy-one ended fatally, a mortality rate of 97.4 per cent. It made no matter whether the wounds were grave or slight, nor where they were situated, the patients died. This complication of wounds made its appearance at various times after the receipt of the injury. From an examination of the series in which the time of the onset of pyæmia was noted, it is seen to have been most frequently upon the sixteenth day, but the wave began at the second day, and did not end until after the three hundredth. In many cases the disease did not appear until after excision or amputation, and there seems to be no doubt in the mind of the author of this volume that the pyæmic infection was induced or influenced by the operative interference. Of course, this is only the record of a fact, and there is no inference that it should have any weight in determining the question of operative interference. Surgical resources are limited, and when an operation is necessary there should be no hesitation in undertaking it, because pyæmia may supervene. As will be seen by the mortality, treatment was of little avail. Quinine would lower the temperature for a time, but the effect was temporary. In a few cases amputation by removing the infecting focus seems to have saved life, but when once fairly established the tendency downward was irremediable.

Many cases of multiple wounds were observed. One man, having been

exposed to a cross-fire at Spottsylvania, presented no less than twenty-eight wounds of entrance and exit. He lived, nevertheless, eighteen days.

With the progress of the war the tendency to depend upon conservative treatment increased. Especially was this the case in shot wounds of the upper extremity. There was also a marked growth in the disposition to attempt to save in shot injuries of the lower end of the femur, and Dr. Huntington thinks that the many favourable results leave the wisdom of the course beyond doubt. Still surgeons in the field and those in general hospitals entertain wide differences of opinion, which can only be reconciled in view of the results garnered in this volume. As we have before observed conservative treatment was followed by the least satisfactory results in the case of the ankle.

It seems to be pretty well settled by the experience of the war that excisions are more fatal to life than amputations; and especially is this seen to be the case in view of the fact that over four-fifths of those done in military practice were of the upper extremity. Yet the historian is of the opinion that the favourable results obtained in civil practice should encourage military surgeons to persist in this direction in suitable cases, and under favourable circumstances. To decide which are suitable cases this book affords the best criterion, in the detailed histories it contains. Even a cursory examination of this most exhaustive volume shows that excisions in the long bones and in the knee and ankle-joints were little less than disastrous, and the ultimate results often deplorable. The experience of the war went to further establish the rule that the requirements of a given case are best decided at the primary examination, and amputations done at once saved very many lives; those that were done during the inflammatory stage, and eluded as intermediate, were notoriously unsuccessful. As before remarked the best method of amputation is not decided by the experience of the war, and circular and flap will continue to have their advocates, and to yield good results. One hundred and seventy-two double amputations were performed, with a mortality varying with the gravity of the operations.

Chapter XIII. deals with the subject of anæsthetics. It is computed that they were resorted to no less than eighty thousand times during the war of the rebellion. It has been impracticable to examine critically this enormous number of cases, but from an analysis of eight thousand nine hundred of them it has been found that chloroform was used in 76.2 per cent., ether in 14.7 per cent., and a mixture of ether and chloroform in 9.1 per cent. These percentages differ from those given in Circular No. 6, which was based principally upon the returns of general hospitals; but when the returns of work done on the field came to be examined, it was found, as was to be anticipated, that the smaller bulk of chloroform caused it to be preferred in so many cases as to raise the percentage from 60 to 76.2.

While the statistics of the war furnish no data to determine the effect of anæsthetics in saving life, its historian is convinced that the favourable percentages of mortality after major operations were largely obtained by their general use. A number of deaths from the exhibition of anæsthetics were reported. These amounted, in the case of chloroform, to 5.4 per thousand; of ether, to 3.0 per thousand; and of ether and chloroform, to 2.4 per thousand. In view of the stress of circumstances under which chloroform was administered, the number of deaths was quite moderate.

Of the four deaths attributed to ether, three of the cases were in an extremely exhausted condition, and the deaths can with great fairness be attributed to their physical condition rather than to the anæsthetic, while in the fourth, the result was evidently attributable to the injudicious administration of an over dose. Since the war, the attempt has been made to obtain reliable data from the experience of army surgeons, and an analysis of the results thus far obtained is given, but the number is too limited to be of much value as yet, though an examination of the tables furnished would seem to add weight to the claim that ether is the safest anæsthetic. Chloroform, from its smaller bulk and more rapid action, will always be in favour in military field hospitals, or wherever the pressure of cases requiring operation is out of proportion to the surgical staff; but ether is without doubt entitled to the front rank among anæsthetic agents as yet known to the profession, under all other circumstances.

Chapter XIV. has for its title *The Medical Staff and Materia Chirurgica*, and in its pages will be found an interesting account of the organization of the medical department, which, during the rebellion, cared for 6,454,834 cases of wounds and disease, and expended in so doing \$47,351,982.24 during the years 1861-1866.

The zeal, courage, and ability of the medical officers is borne witness to by this work. Many died in the pursuit of their duty, and the strain made upon them, both physical and mental, was not exceeded in any other branch of the service. Indeed, the moments of idleness were few to the faithful medical officer. The long periods of inaction which preceded and followed many of the great battles were times of ceaseless effort on the part of the medical staff. Thirty-two were killed in action; eighty-three were wounded, while the total number of deaths in rebel prisons, from accidents and other causes incidental to their position, aggregated three hundred and thirty-six. Chapter XV. and last, treats of the transportation of the wounded. Considerable space is given to the various suggestions made as to suitable forms of caecolets and horse litters. Much time and money were expended in this direction, with little or no good result. The weight of the apparatus, the difficulty of obtaining and keeping properly trained animals, and the rough and wooded condition of many parts of the country in which military operations were carried on, prevented their adoption. Stretchers and ambulances were the means chiefly relied upon for the removal of the wounded from the field, and after the organization of the ambulance corps they were found amply sufficient. It was some time before this corps was established owing to the opposition the plan met with from the commanders, who objected to anything which increased the size of the army trains. The immense advantages of a regularly drilled body of men, whose sole duty was to care for the sick and wounded, were, however, too great to be thus overcome, and, after several partial authorizations, an Act of Congress was passed in March, 1864, by which the organization of a proper ambulance corps was ordered and placed under the control of the Surgeon-General. By this Act the results of the severe fighting during the last year of the war were much mitigated, and the wounded of the Wilderness—Spottsylvania Court House, Cold Harbor, Petersburg, and the campaign in Georgia and the Carolinas—were promptly and systematically removed from the field, and transferred to proper base hospitals with a minimum of suffering and delay. This was a triumph for the Medical Department, and was unattended by any

of the stampedes or panics which it was feared by General Halleck would attend the presence of the noncombatants of the ambulance corps.

Considerable space is given to the various forms of ambulance wagons proposed and tried through the war. Of these the Wheeling pattern, and later on that devised by Brigadier-General Rueker, were by far the best. The first was very light, could accommodate two recumbent patients, and was very largely used during the early part of the war. Later the Rueker ambulance was very generally adopted. It could accommodate four persons lying down, and nothing superior to it is as yet known.

Next follows a very interesting though brief account of the methods adopted for transporting the sick and wounded over long distances by means of trains and boats. Early in the war box cars were largely used, bunks being arranged in parallel rows, and windows cut for the admission of light and air. Many thousands were thus conveyed to base hospitals with comparative comfort; but with the progress of the war, and the more perfect organization in every branch of the service, very great improvements were introduced, until the fully equipped "hospital train" was evolved. These trains were used both in the East and West, but attained a higher development in the latter region on account of the distance at which military operations were carried on from the base line.

When Sherman was before Atlanta, previous to his march to the seaboard, these trains ran daily, and the distance to the base line was four hundred and seventy-two miles. The engine stacks were painted a bright red, and three red lanterns were hung beneath the headlight at night. To the honour of our temporarily estranged brethren of the South, he it said, that no instance is known in which either regular or partisan Confederate troops interfered with trains so designated. On one occasion, such a train was stopped by Morgan's scouts and switched off on a siding. After inquiring whether the hospital train had sufficient stores for the sick and wounded, they tore up the main track, and then pillaged and destroyed five supply trains which had arrived at the spot. A complete hospital train carried everything needed by the sick, being to all intent an ambulatory hospital. It consisted of ten cars, and accommodated about two hundred patients. It contained one box car for stores, one kitchen car, one passenger car with seats, for the more slightly wounded, five cars with beds, an office car for the surgeon, and a caboose for the conductor and other train hands, such as is ordinarily attached to freight trains. Detailed plans of these cars are given.

On western rivers and the Atlantic coast transports were largely used for the removal of the wounded, and an interesting account of the arrangement of the boats used for the purpose completes the work, and brings us to the end of our task.

A few general remarks upon this monument to the efficiency with which the affairs of the Medical Department were administered will not be out of place. A distinguishing feature is the thoroughness with which cases have been pursued to their conclusion. No pains have been spared to attain this end, and with the aid furnished by the records of the Pension office, the ultimate issues of very many cases are laid before the reader, in a way hardly equalled by any other work. To accomplish this has required an amount of clerical labour not at the disposal of any private writer; but those who have had the work in hand have certainly made good use of the advantages placed at their command by the government.

The care which has been taken to present the views of other writers, and to compare the results of other military experiences, is a very commendable feature in the work. In foot-notes upon particular subjects will be found a summary of those experiences, which help to give many of the subjects discussed the completeness of monographs, so that the student who turns to any particular part will find it treated in an almost exhaustive manner. Of course absolute completeness of returns is not claimed for this volume. Nor was completeness possible. In the dark days of the Rebellion the writer of this review served in a hospital near the front, where, from the incompetence of the surgeon in charge, and the exigencies of the situation, very imperfect records were kept, but the totals recorded in this history are sufficiently large not to be affected by the omission of a few operations, and the averages obtained may safely be trusted in judging of the merits of any surgical procedure treated of in its pages.

No less than one hundred and eighty tables have been prepared for this one volume, many of which are extended and elaborate, exhibiting enormous labour and care in their preparation. Five hundred and ten woodcuts are introduced into the text, while forty-four lithographs and chromolithographs illustrate subjects and cases of especial interest. Some of these last are of more than average excellence, and all are creditable specimens of the modern lithographic art. There is also included a list of operators and authors who furnished accounts of the cases included in this volume, a table of contents, and a subject-matter index of the entire surgical part.

As we have turned over these pages, we have come across the names of many friends, of many who in the years that have supervened have risen to eminence in their profession, and this feature gives to these ponderous tomes a personal interest which does not always pertain to surgical works. This feature will of course disappear with time, for already many names familiar to us then represent but memories to us now; but the value of these volumes will be permanent. Dr. Otis, who planned and executed so much of this great work, did not live to see its completion; and since this book was laid on our table, Dr. Barnes, under whose direction it was prepared, has also died. We mourn for the departed; but those of us who witnessed the pangs and woes, and bore our small part in the suffering and sorrow of the war of the Rebellion, will be glad to let their memories of those events pass into the comparatively dim realm of history.

On a bright morning in the spring of 1863, in Tennessee, the writer of this notice first heard of the proposed Medical and Surgical History of the War, from gentlemen connected with the Surgeon-General's office. One of them has lived to occupy, with distinction, a professor's chair in the Jefferson Medical College, the other, soon afterwards, met his death in one of the numberless conflicts carried on upon the waters of the Mississippi. After twenty years it remains for us to express our high sense of the value of this part of that history, and of the ability, judgment, and thoroughness with which it has been carried to completion. S. A.

ART. XVIII.—*The Pathology and Treatment of Diseases of the Ovaries (being the Hastings Essay for 1873)*. By LAWSON TAIT, F.R.C.S., Edinburgh and England, Surgeon to the Birmingham Hospital for Women, Honorary Fellow of the American Gynecological Society, etc. Fourth edition, re-written and greatly enlarged. New York: William Wood & Co., 1883.

It is possible that the author of this work is still a stranger to many in this country. He holds no position as teacher in any of the great schools of medicine of Great Britain, and his name is therefore not prominently before the profession. The original essay, of which this book is the outgrowth, had no circulation here, while his small but excellent *Manual of Diseases of Women* was re-published in such a way that the number of its readers could but be limited. But he will need no introduction to those who have seen the results of his operations during a few years past, as published in the journals,¹ and they will eagerly welcome a book from his pen. To others, who have not been so fortunate, it will suffice to say that Mr. Tait has attained a position never before reached by one of his age outside the metropolis. Farther than this, they will learn his characteristics from this work. The individuality of the author is marked on every page. He is one of those who hold opinions and is not backward in stating them. Nor does he wear second-hand mental garments, for upon some very important points he is at issue with the great majority of the surgical world. His creed is based on his experience, and that has been both wide and varied. He is independent, original, and enterprising; a bold and skilful operator; candid and honest in confessing his mistakes. When we add that in this book he presents and sustains novel doctrines in physiology and pathology, describes and recommends new operations, and extends the bounds of abdominal surgery, that he records a success which has never heretofore been attained, we think it will justify, and even demands, a somewhat extended and careful examination.

The opening chapter is upon the Anatomy and Physiology of the Ovaries, subjects to which in former days the author has devoted careful and close study. While he refers frequently to the researches and teachings of De Sinéty and of the lamented Balfour, he relies largely upon his own observations, especially upon points yet unsettled, or as to which there is difference of opinion. Some of these are very important and of practical interest, to many of them can be given but a passing mention. Thus, he dissents from the statement of Waldeyer, which has been current of late years, that the posterior surface of the ovary is not invested with a peritoneal layer. From the course of development there should be such a layer, and having made a special study of the subject the author states that he has demonstrated it. He finds in the anatomical arrangement and structure of the ovarian veins an explanation of the greater frequency of ovaritis and dislocation of the ovary on the left side; and, extending the doctrine a little, we suppose also of the very general existence of pain in the left iliac region in "uterine" cases. Credit is given to Dr. Brinton, of Philadelphia, in his researches as to the greater frequency of varicocele

¹ An account of one hundred and ten consecutive cases of abdominal section, performed since November 1, 1830.—*Medical Times and Gazette*, Nov. 1881.

An account of two hundred and eight consecutive cases of abdominal section, performed between Nov. 1, 1881, and Dec. 31, 1882.—*British Med. Journal*, Feb. 17, 1883.

in the male on the left side, for the discovery of the fact that the spermatic vein on that side has no valve. The author is not a believer in the analogy between menstruation and the "rut" of animals. But now comes Dr. Wiltshire¹ with an elaborate study of the subject in the light thrown upon it by the doctrine of evolution—a doctrine in which Mr. Tait is a believer, and thinks he proves the "identity" of character of the two phenomena. So authorities still differ! Mr. Tait is not a believer in the dependence of menstruation upon ovulation. So far as the argument against the generally received doctrine is based on the continuance of the function after double ovariectomy, it is worthless in view of one fact, fully recognized on a preceding page, which is, that supernumerary ovaries are not infrequently found. Thus, Beigel gives eight cases in which there were one or more extra ovaries, out of three hundred and fifty examinations—a proportion large enough, certainly, to meet the exceptional instances in which this incongruity of menstruation after ovariectomy appears. He fully adopts the teaching of Ritchie, that the formation of Graafian follicles goes on from an early period of life, and that this doctrine explains the occurrence of ovarian tumours in young children, and the development of dermoid cysts. Accordingly we find the doctrine that "the whole process of ovulation goes on before puberty," and "the structure of the ovary does not seem changed in the least by the accession of puberty, save in its vascular arrangements." The continuance of ovulation after the menopause follows as a matter of course, and the author says:—

"I have seen, in the ovaries of very old women, structures which I could not have decided as being in any way different from those seen in the ovaries of women in the prime of life."

The *corpus luteum* is, to the author, no evidence of menstruation or of pregnancy, and, as he states what he has seen, it is but just to present it:—

"I certainly have seen, in one ovary of the ninth year, an appearance which I could not have told from an adult *corpus luteum*, of about fifteen days after rupture of the ovisac."

"It by no means follows, however, that an ovisac thus delayed in disappearance has been the seat of an ovum which has been fertilized, for I have seen three such corpora lutea in the ovary of a woman who had been confined, seven months before my operation, of one child—her only one."

He denies, therefore, all medico-legal value to this structure, and "would not give an opinion, from any number of corpora lutea, as to whether they indicated past pregnancy or not."

What, then, is the origin of menstruation—this "curious and objectionable phenomenon," as the author terms it—"for which no one has ever yet suggested a useful object?" And what is the seat of the great change which marks the transition of puberty, if it be not in the ovaries? The answer to both queries is—the Fallopian tubes. The power of these tubes to attach themselves to the ovaries, changes in their structure—vascular, muscular, and epithelial—are at once the evidence of puberty and the cause of menstruation. Doctrines so novel and important require, in justice to the author, full statement:—

"It is perfectly certain that no one has yet recorded one instance in which the tube has been seen fastened to the ovary before or after the menstrual period of life as it is during that period. Yet ovulation goes on before puberty and after the climacteric freely. The change in size and vascularity of the tubes at puberty,

¹ British Medical Journal, 1883.

and their diminution at the climacteric, and the beginning and cessation of their movements, form, the most curious of all, the most remarkable features of those functional changes, and are quite enough to show either that the tubes are more markedly under the same periodic influence as that which produced the menstrual flow, or that they themselves are the cause. Finally, I have, during the last few years, had the opportunity of seeing the ovaries of a number of women, whose abdominal cavities I have had to open for various conditions not connected with diseased ovaries, and I have always found that during menstruation the tube is fastened on the ovary, whether there be a ripe follicle at the point of adhesion or not; that both tubes were generally fastened to the respective ovaries, though in one ovary there may have been no appearance of a ripe ovisac; that I have very frequently seen an ovisac on the point of bursting, or just burst, when the patient was midway between two menstrual periods, this being a very frequent experience, as I always selected, when I could, a time midway between the periods for my operation, and in these cases I never found the tube fastened on the ovary. Finally, I have removed, in two cases, ovaries with the tubes fastened on them, during menstruation, in none of which were there any ovisacs approaching ripeness."

This is strong testimony as to the independence of ovulation and menstruation. In the failure of the fimbriated extremity of the tube to grasp the ovary just over a ripened vesicle, a matter entirely accidental, the author finds an explanation of the fact that conception does not take place far more frequently, and as it should were ovulation and menstruation always coincident.

The relation of the doctrine of the tubes being the real source of the periodic flow from the uterus will be seen further on. Meantime, if it be true, the removal of them should always certainly cause cessation of menstruation. Such is the argument as to the ovaries: menstruation continues, in some cases, for months after removal of these glands, therefore they cannot be its cause. Now, forty pages or so farther on, we find an account of twenty-two cases in which the author removed the tubes, and this statement:—

"Menstruation has, in most cases, been arrested immediately, but in a few it has lingered for a month or two."

This is just what happens after double ovariectomy. The statement will hold good for the one case as well as the other. The deduction is obvious.

The second chapter of the work is devoted to several pathological conditions of the ovaries and oviducts, and considers some subjects of great practical interest. The ovaries are extremely liable to be arrested in their normal development, and this condition gives rise to delayed puberty, to dysmenorrhœa, and to premature menopause. The zymotic diseases, especially scarlet fever, are believed by the author to be the cause of this arrest, and his remarks upon this class of cases are well worthy of attention. He uses, among other therapeutic measures, Simpson's intra-uterine galvanic stem pessary. Considerable space is devoted to dislocation of the ovaries, the greater part of it to inguinal hernia of the ovary, but his remarks upon the displacement into the retro-uterine pouch deserve more notice here from their practical value. He quotes Goodell freely as to the serious consequences and treatment of this affection. While he does not doubt that, in many cases, the dislocation causes no suffering at all, in others it renders life a burden and a prolonged misery. He points out that in far the greater number of cases the dislocation follows a miscarriage or labour, and bears a close relation to sub-involution of the uterus. Both ovary and uterus are congested, far heavier than normal, retroversion

of the one and dislocation of the other follow, and chronic inflammation is the result. Intractable menorrhagia, aggravated monthly by menstruation, is a leading symptom until confirmed invalidism is established. This introduces the first notice of Battey's operation. In diagnosing between a retroflected or retroverted fundus and an enlarged and tender ovary, the author carefully directs that the finger should be relied upon, and that the sound should not be used, as it is sure to do serious injury if adhesions exist. He strongly condemns a resort to this instrument in these cases, and indeed, elsewhere in the book, shows that it is far from a favourite with him:—

"If I may here venture to sum up my experience of this instrument, extending now more than twenty years, I would say that it has done an infinite amount of mischief, and that probably we should have lost nothing if it had never been invented, and that the more experience grows in practice the less will this instrument be used."

Necessarily, as the result of the author's physiology, inflammation of the tubes plays an important part in pathology, and has consequences of the utmost importance. Destruction of the epithelium is one of them, entailing sterility, and causing tubal pregnancy, for the author refuses to accept the doctrine that conception takes place, as a general rule, before the ovum reaches the uterus; hence, the epithelium being lacking, the ovum is delayed on its passage, and its development in the tube favoured. But occlusion of both ends of the tubes is by far the most serious lesion, and from it results hæmato-, pyo-, and hydrosalpinx, according to the quality of the fluid which distends them, but the conditions which determine the nature of the fluid are not known. It is for these conditions that the author has practised the operation of "removal of the uterine appendages," an operation which has excited a great deal of opposition, has been the subject of a great deal of animadversion, and which is still under discussion. In a number of cases, where removal was impossible, he has opened the cyst, introduced a drainage-tube, and stitched the walls of the cyst to the edges of the wound in the abdomen, and thus effected a cure. But, if possible, entire ablation of both ovaries and tubes is performed. The details of several cases are given in full.

"All my patients, twenty-two in number, have recovered, and of those in which a sufficient time has elapsed since the operation I can say confidently that they are all completely cured."

The history of the cases which require this severe mutilation always shows a severe pelvic inflammation, which may have been puerperal or the result of suppression of menstruation or of gonorrhœa. The symptoms are pain—severe pain—especially after intercourse and during the monthly periods, and, generally, profuse menstruation or metrorrhagia. The physical signs are enlarged and painful ovaries, generally fixed in position.

"Distinct fluctuation can often be felt, and their peculiar sausage-like shape has frequently enabled me to diagnose correctly the condition previous to the operation."

"No treatment whatever relieves these cases, save removal of the uterine appendages."

"Most of my cases had been in the hands of some of our most eminent specialists before they came to me, and an infinite variety of treatments, both by drug and operation, had been used fruitlessly. They had all been treated by pessaries, and many of them had had their cervical canals dilated and cut."

In opening the subject of extra-uterine pregnancy, the author pays a tribute to the value of the lamented Parry's treatise, and quotes Thomas as agreeing with himself as to the few varieties which exist, as compared with the minute distinctions and multiple classification of former writers. He admits the tubo-ovarian, the tubal, and the interstitial, although in another page, he says: "I maintain that every case of extra-uterine pregnancy is tubal in its origin, and that it may become intra-peritoneal or extra-peritoneal, just as the tube happens to burst."

It is to be regretted that one so successful in abdominal surgery as the author has had no cases of ruptured cyst rescued by operation. It has been frequently proposed, even urged, first by Rogers, as the only means of rescue for one of the most deplorable and overwhelming accidents which can befall a woman. Twice the author has been on the point of performing it, but was restrained by scruples as to the diagnosis; in both cases a post mortem justified the belief that the patients might have been saved.

Extra-uterine pregnancy in its more advanced stages need not detain us, except in regard to two points. The author's detailed experience with cases of pregnancy with thin uterine walls, which were supposed to be extra-uterine, is extremely interesting and instructive. Six times he has been called to such cases where the question was as to the child being free in the abdominal cavity, and in all in due time delivery took place naturally. He justly says that this point has not yet received the notice it deserves by obstetrical writers. In cases where the cyst is packed down in the pelvis, and diagnosis is difficult, the author strongly advises against the use of the aspirator, being no more friendly to this instrument than to the sound.

"The aspirator may tell you that a tumour contains serum, blood, or pus, but that helps you but little as to the seat of the disease, and nothing at all as to its treatment. Besides, the risk of the aspirator is great, quite as great as the risk of an abdominal section. My use of the aspirator in my special line of practice is, therefore, diminishing, and in all cases of abdominal tumour, where there seems a reasonable prospect of doing good to the patient, I open the abdomen and make out the condition. I have never had to regret the practice, and I very often have had reason to be pleased with its results."

It is in connection with this subject of extra-uterine pregnancy that we experience the greatest disappointment as to the book. The subject of early diagnosis does not receive that consideration which it deserves, indeed, scarcely any mention at all. Truly, he says, the diagnosis in the early stages "is surrounded with difficulties." Then it certainly should not be dismissed with about ten lines, nor the statement made that the only conditions from which it is to be differentiated, are displacement of the normally pregnant uterus during the early months, complicated with fibro-myoma or cystic disease of the uterus, and, more rarely, pregnancy of one-half a double uterus. We will not doubt that with the author's diagnostic powers these are all; but, for the benefit of readers less gifted, other conditions likely to, and which not infrequently do, cause doubt and anxiety, should have been considered. Two prominent symptoms have been held to indicate, even to be pathognomonic of, extra-uterine pregnancy in the early stages: severe attacks of pain in the pelvis accompanied by a sanguineous discharge, and the discharge of a decidua. These are not even mentioned by the author, and not having considered an early diagnosis it is not surprising that there is nothing said of treatment before rupture. Neither puncture of the sac with injection of narcotics, or the

application of electricity, to destroy the life of the fœtus and prevent disaster, receive a word of notice! Yet if we are to do the best for these cases it is to be done early. The omission doubtless results from the manner in which the book has been built up, and here, as elsewhere, we regret the lack of that fulness of detail which a subject would have received had it taken the form of a treatise.

The changed vascular conditions of the ovaries brought about by puberty have their legitimate pathological consequences, and, while much relating to inflammatory affections of these organs yet remains obscure, the author felicitates himself upon the fact that our knowledge is being rapidly increased, the result of more frequent operations for diseased conditions other than cystoma. He treats of hyperæmia, and acute and chronic ovaritis. Menorrhagia is very frequently the expression of the first, the result of an over-sufficient and precocious ovarian activity. Stimulated by the over-refinement of our civilization, menstruation is established "while the ovary is still in its infantile or incompletely developed condition;" that is, "while it is forming incomplete cells, whose nuclei are incapable of fulfilling their great functions." These cases demand regulation of life in every respect, and the author is outspoken in regard to the injurious influence of the study of music. He is sound on the deleterious effect of iron in these cases, and this seems to be there, as it is here, one of the most common of therapeutic sins. For acute ovaritis he recognizes five causes: injury, gonorrhœal infection, puerperal septic poisoning, exanthematic fevers, and acute rheumatism. Some of the author's remarks here on etiology and pathology are exceedingly interesting and of great practical value. Further experience and observation have confirmed him in the belief of the influence of the exanthemata, and especially smallpox and scarlet fever, in producing inflammation of the ovaries. But, he believes the inflammation distinct in character from the ordinary form. In the latter the peritoneal covering is affected and it should be termed peri-oöphoritis, while the exanthematic inflammation is interstitial, affecting the follicles. In the one menstruation is not suppressed and may be profuse, in the other we have ovarian atrophy with amenorrhœa, and in puerperal cases superinvolution of the uterus. Chronic ovaritis produces hypertrophy of the glands, and of this there are two forms, one affecting the follicles of the gland, the other its fibrous tissue. This follicular hypertrophy does not form the ordinary cystoma of the ovaries. The organs are but little increased in size, yet, in the author's opinion, there is "a close and hitherto unsuspected connection" between this form of disease "and some of the most severe uterine symptoms that patients suffer from." In any event, such ovaries are frequently the cause of severe menorrhagia, which nothing but their removal will control. Abscess of the ovary is a rarer result of chronic ovaritis, yet cases are given.

This is but the briefest possible sketch of the author's views as to this branch of ovarian and tubal pathology, but indicates the basis of some of his operative measures. These cases are characterized by pain, menstrual and inter-menstrual, by uncontrollable menorrhagia, by dyspareunia to an extent that renders intercourse impossible, and the patient sinks into confirmed invalidism. Then surgery presents relief by removal of the organs which are the cause and origin of the suffering. It is not "normal" ovariectomy, for the organs are always diseased, and the author makes the powerful plea, that in performing this operation, the surgeon does not

unsex the woman, as has been urged in opposition to the measure, but really resexes her—enables her to resume relations with her husband, which had long been impossible. Many cases are detailed in full, illustrating these different phases of disease and supporting the author's position.

The fourth chapter of the work is on Ovarian Tumours and the conditions which simulate them. It consists of about one hundred pages, of which more than one-half is devoted to the pathology of these growths. There is no lack of interest in this part of the book, for here again the author has original views based on his own investigations, but much of the chapter is argumentative, some of it is taken up with details of cases of the rarer forms of tumour. We can only give the leading points of doctrine, and are obliged to confess that some portions are not clear, and feel sure that the reader will regret the lack of a plain and tabulated classification at the outset. He opens with an expression of dissatisfaction at the many important questions yet remaining, as they were in 1873, unsettled. In the papers of De Sinéty and Menassez, published in 1878, he finds confirmation of many of his views, but still is far from being in harmony with them upon all points. His leading divisions of ovarian tumours are cystomata, dermoid, and parovarian. In regard to the first, he rejects the doctrine of De Sinéty, that they have their origin in the tubes of Pflüger, and denies that they are growths of the connective tissue of the gland, maintaining that they are always the result of dropsical distension of the Graafian follicles. "The function of the ovary is one of cyst formation from its earliest existence to its latest, and in its pathology we need not go far away from its physiology." He rejects the term "proliferous," as defined by Wells, in the sense that the secondary cysts are outgrowths from a parent cyst. They are secondary only so far as date of growth is concerned, "but they are the younger brothers and sisters, not the children, of the larger sacs." Dermoid cysts, on the other hand, are the result of an altered nutrition of one or more ova.

"But there may be doubt as to whether the abnormality takes origin in an ovum of the individual bearing the tumour, or in the ovum from which she herself was developed; in other words, whether the tumours are abnormally developed, or are due to inclusion."

The author supports this doctrine by arguments drawn from comparative physiology—dermoid cysts originate by a process analogous to pathogenesis.

The origin of parovarian cysts is plain and simple, but we have the new and important doctrine introduced and emphasized that they alone constitute the unilocular tumours which are called ovarian. The author does not believe in the existence of a unilocular ovarian cyst. Such a thing is not consistent with his doctrine of the origin of cystomata, and by observation he has learned that in all these cases of monocysts the ovary may be found, if sought for, separate and distinct from the tumour, or spread out on its walls.

"In the records of ovariectomies performed, these cases have, up till now, always been stated as ovariectomies, and the ovary and tube associated with the tumour have been removed with it. Both the record and the removal of the ovary are mistaken [?]. The operation is not an ovariectomy at all, and nine times out of ten both ovary and tube might easily be separated from the tube and left, and this practice I now always try to follow."

Then he comes back at his critics!

"It is very curious that those who are crying out most loudly against the unnecessary removal of ovaries have been in the habit of pursuing this practice in the case of parovarian tumours without compunction."

The author's remarks upon the connection between ovarian cystic disease and cancer are of great practical interest. It is difficult to follow him through the minute pathology of malignant degeneration, and we are compelled to say that, from repetition and want of clear arrangement, his views are by no means easy to get at. The origin of the process is in the epithelium, and he quotes De Sinéty in support of his position. The epithelium of an enlarged follicle is very different from that of one of normal size. There is a reversion of type of the cells "towards immature, incomplete, and rapidly growing elements which are practically cancerous."

Then follows a statement which needs confirmation, and should have been supported by statistics, instead of the recital of a single case:—

"As a matter of fact, ovarian cystomata are a great deal oftener malignant than has yet been admitted. The recovery from an ovariectomy is generally so rapid and easy that at the end of a month we say 'cured,' and discharge the patient. But a number of these 'cures' die speedily of cancer of the peritoneum, or of other organs, and the more our primary mortality from the operation has diminished, the more numerous have become these secondary deaths from cancer, occurring between three and thirty months after the operation."

The author then refers to the clinical fact "which all ovariectomists are quite familiar with," and to which, he says, Keith has drawn especial attention—"that the rupture of certain cysts, on the escape of their fluid into the peritoneal cavity, is followed by, or at least associated with, the infection of the general peritoneal surface with papillary cancer."

He then strengthens [?] his doctrine of the connection between the two by saying:—

"On the other hand, I have seen over and over again the same cells and the same expressions of immature growth in the peritoneum, without the presence of any ovarian tumour!"

The practical conclusion has been reached by others from other grounds:—

"The conclusion from all this is that to which I have already pointed, that the growth of ovarian tumours is associated with a tendency toward malignant disease, which finds constant clinical expression, and which receives its explanation in the marvellous changes we find produced in the epithelial linings of its cysts. . . . One thing I am certain it clearly establishes, and that is the absolute propriety of removing ovarian tumours at a very much earlier stage of their existence than has been, till recently, the accepted rule in practice. If these epithelial changes are progressive—as doubtless they are, and if they are malignant—as I certainly believe them generally to be, then, acting upon the principles which guide us in the treatment of all tumours, we ought to remove an ovarian cystoma early in its history, before these changes have been effected, and certainly before there is any risk of cyst-rupture."

The changes in the epithelium are not alone in one direction or of one character—there is no kind of cell of epithelial origin which may not be found in the cysts of an ovarian tumour. Upon this ground Mr. Tait rejects entirely the doctrine that a diagnosis of such tumours can be based upon any particular kind of cell found in their contents. He has no faith in Dr. Drysdale's "ovarian corpuscle."

The diagnosis of ovarian tumours, direct and differential, is not presented in a satisfactory manner, especially when we consider the large experience which the author has enjoyed. While the practitioner will peruse this portion of the work with deep interest, and derive profit therefrom, it is far from being adapted to the wants of the student. It lacks in methodical arrangement and clear statement, in comparison and antithesis; and, moreover, is far from being complete upon some very important points. We should be sorry to do injustice to so distinguished an author, and therefore feel compelled to specify. Upon the differential diagnosis of pregnancy, there is no mention of the mammary signs. We have already noted the lack of consideration of the rational symptoms of extra-uterine pregnancy; here we expected compensation in a full and minute detail of the physical signs. All we have is this!

"If the uterus is drawn up very much in front, and the posterior lip seems to be lost upon the tumour, then we may expect a tubal pregnancy."

What the following means in regard to the differential diagnosis of ascites we cannot understand:—

"Ascitic fluid may be generally recognized by the fact that it is associated with the uniform occurrence of a tympanitic note on percussion."

In regard to the value of hemorrhage in the differential diagnosis of myoma, on page 190, he says, that with ovarian tumours this symptom has been "*repeatedly* noticed in my practice," while, on page 216, we read that it is a "most constant clinical feature characterizing myoma, which is *seldom met with* in ovarian cystoma."

There is one great unsolved point in the diagnosis of abdominal tumours, and that is to differentiate an ovarian cyst from fibro-cystic tumour of the uterus. The author acknowledges one mistake, admits the difficulties of the diagnosis, and says that "a correct diagnosis is possible only in the hands of a surgeon who had made two or three previous mistakes." Then we submit that the following is but a scant measure to be meted out to so important a point:—

"The tumour will be found associated with the uterus, the latter moving along with the tumour when it is moved, and being dragged upward by it to an extent that ought always to make us cautious and warn us to watch and wait."

The practitioner will find in the author's narrative of cases profitable reading and food for reflection. He inculcates the utmost care and the closest investigation, repeated again and again, if need be, before making a diagnosis. He urges the importance of patience; many a case is cleared up, and many a blunder avoided by the lapse of a little time. Nothing could more strongly impress these lessons than the errors which he candidly confesses, for where one with so large an experience has gone astray how easy for others. He records in this chapter one case of fibro-cystic uterine tumour operated on for parovarian cyst; says he has "more than once opened an abdomen under the complete belief that I should find an ovarian tumour, but have instead found only masses of cancer, with an abundant ascitic effusion;" on "several occasions" he has proceeded to perform ovariectomy, and found tumour of the kidney; and once a tumour of the liver presented itself. Those only who have no practical acquaintance with the difficulties of the subject will carp at such confessions.

The author's experience with and remarks upon phantom tumours, spurious and real pregnancy, hydramnios, and hydatids are exceedingly

instructive. Of the latter he has seen four cases, but has never met with the peculiar fremitus which is said by some to characterize the tumour. In regard to pregnancy he places a very high value upon the contraction test, even estimating it above auscultation.

"If the hands be placed on the abdomen of a case of suspected [?] pregnancy, and a fluctuating tumour be felt, that tumour will become quite tense and like a myoma, if the examination be prolonged for a few minutes. Then, again, it will become flaccid and fluctuating, and this alteration will go on rhythmically at varying intervals. Once this sign has been felt and recognized, I think it will be impossible for the observer ever again to be deceived by a pregnant uterus."

It will be seen that the sign is spoken of as a constant one; nothing is said of exceptional cases, or of conditions interfering with observation of it. However, this much is certain, the author has the prime element of a first-class diagnostician—a high estimate of the value of, and confidence in, the sense of touch. His remarks on fluctuation and its detection are excellent.

In the chapter on ovariectomy we are brought directly in contact with the practical work of the author, and face to face with some of the most important surgical questions of the day. The time to operate is, for the author, as soon as the tumour is discovered, and this is rapidly getting to be the general practice, and has been ably advocated by Mr. Bantock.¹ He claims to make no selection of cases, however advanced a case may be; "even when there is strong reason to believe that the tumour may be complicated with malignancy," he makes an exploratory incision:—

"An exploratory opening never does any harm [?], and very often does a great deal of good. . . . We sometimes see an exploratory incision arrest the progress of an irremovable tumour for a considerable time." [?]

"I should not hesitate to operate in a case where there were even distinct indications of important visceral disease. I have operated on two patients with marked disease of the lungs, and they are both still alive, and one has got nearly well. I have operated in an advanced state of Bright's disease, and the patient recovered."

As to who should perform the operation he makes a strong plea for specialists. No man in attendance on promiscuous cases, no man who has not seen a good deal of abdominal surgery should operate. The cases are too few, while the lessened mortality obtained by experienced hands is too apparent to justify every one in undertaking it.

In preparing for the operation he inculcates, as he does in diagnosis, the minutest care and the closest scrutiny of every point. He expresses the same estimate of the magnitude of little things that Emmet does in the practice of gynaecology:

"As a successful ovariectomy is the resultant of a large number of petty details carefully attended to, no amount of care and precision can be too great in carrying them out."

As to the sponges, whoever reads his graphic account of that thirteenth sponge will never forget the lesson! He states that he has heard of ten other cases in which a sponge has been left in the abdominal cavity!

The author is no more a friend of tapping, as a curative measure, than for diagnostic purposes. His opposition to the measure is extreme, and, we are obliged to add, unreasonable. It is not alone for ovarian cystomata

¹ A Plea for Early Ovariectomy. London, 1881.

that he opposes it, but for parovarian cysts as well, which "are now removed without any risk at all. I have never lost a single case."

"Here I may repeat what every one knows now, that it never cures a tumour, [?] and that it only brings about complications. It is my firm belief that, if ovarian and parovarian tumours were never tapped, but were removed early in their history, we should have only a casual mortality from the operation of ovariectomy."

In this he is in accord neither with Keith,¹ whose apostle he is, nor with Wells,² whose apostle he certainly is not, nor will he be followed or believed by any one whose even much more limited experience has furnished an instance of a cure by tapping. "There is an impression abroad," Mr. Tait says in another place, "that these cysts are occasionally cured by tapping." Doubtless, Clay laboured under such an impression after he had forty cases cured by a single tapping, and only six which filled again!³

Parovarian cysts are not all alike as to their contents, as taught in this book, as shown by Garrigues.⁴ May it not be that in those filled with limpid fluid, tapping will often prove curative, while it will always fail in those having thicker or more darkly coloured contents.

The three great points of ovariectomy are the treatment of the pedicle, the antiseptic system, and drainage. In regard to the latter, the author is very brief, says he has had considerable experience with it, and is convinced that there will occur, every now and then, a case in which it will be absolutely necessary, but nowhere points out for the benefit of the student or the inexperienced, the circumstances which demand it. His remarks on the large quantity of fluid which sometimes pours out of the peritoneum through the tube are interesting. He thinks a healthy peritoneum, being a huge lymph-sac, could be made to drain away an indefinite quantity.

"My own view about drainage, is that it will be useful only where some addition to this lymph-stream is made greater than the outlet can carry away. The fact that I have been so successful in my operations without drainage, makes me think it probable that I have unconsciously substituted purgation for drainage; for, on looking over my records, I find that in very many of the cases where Dr. Keith would have drained, I have purged. . . . But it will remain for some time an open question which of the two channels, the drainage-tube or the intestinal canal, will prove the better vehicle."

It should have been premised, that in after-treatment Mr. Tait does not take any great pains to keep the bowels quiet, and even resorts to cathartics without hesitation.

In the treatment of the pedicle Mr. Tait uses the ligature almost exclusively—the ligature cut short and the abdominal wound closed. For this, since it is supported by abundant success, he deserves the highest praise. As it required great moral courage on the part of Keith to break away from the clamp, supported as it was by the high authority and immense experience of Wells, so it required strong convictions and firm confidence in them, to depart from Keith's plan with the cautery, and adopt any other. Yet Mr. Tait has done it, and thereby ovariectomy has

¹ American Practitioner, Nov. 1881.

² Ovarian and Uterine Tumours. London, 1882.

³ Peaslee, on Ovarian Tumours, p. 100.

⁴ Amer. Journ. Obstetrics, Jan., April, July, 1882.

been improved, for an operation approaches perfection as it is increased in simplicity. The clamp he uses only in very exceptional cases.

"Probably not more than two or three cases in a hundred require now to be dealt with by the clamp; certainly I have not met with more than one for the last three years. The kind of pedicle requiring the clamp is thick and soft, and so short as to contain, perhaps, a small piece of the tumour. With such a pedicle the extra-peritoneal method is admissible, and probably is superior to treatment either by the cautery or ligature; but I am not quite sure that a combination of a drainage tube with either of these latter methods may not yet be found superior to the clamp."

He has devised a clamp which may be termed a wire-constrictor, and has used it "in thick pedicles in eleven cases with perfect success, and six of these were uterine myomatoma." But, for general use, he not only rejects the clamp, but believes it to have been decidedly injurious, both as to the rate of mortality and the progress of the operation. He enters into a somewhat elaborate history, if elaborate may refer to the number of pages occupied, of the different steps by which the operation has advanced to its present position. Nathan Smith, in 1822, was the first to cut short the ligature, return the pedicle, and close the wound. But this Mr. Tait would belittle by calling it a parovarian cyst, and no ovariectomy at all, and this he does of the majority of the early operations. This is scarcely fair. To enter the abdomen was at that time a greatly dreaded proceeding; moreover, it is only a later pathology which has established a distinction between the two kinds of tumour. Therefore, those who were bold enough to operate deserve all the honour they have received. To Clay belongs, in his opinion, the larger share of the credit of giving the greatest impulse to abdominal surgery, and thinks that if he had abandoned the long ligature his mortality would have dropped to present limits. Next to him he places Baker Brown, with his treatment of the pedicle with the cautery, and singularly enough, does not mention Tyler Smith, although, some forty pages further on he quotes from Mr. Doran, that he was "the first authority who regularly and systematically advocated complete intra-peritoneal ligature." Then came Wells with the clamp, and after him Keith, who based his brilliant success on four points: drainage, the cautery for the pedicle, compression forceps, and ether. After reviewing and comparing the mortality of the different operators, the author says:—

" . . . The introduction of the clamp was a decidedly retrograde step in the history of ovariectomy. When I began my own practice in 1867, I employed the écraseur, a variety of the intra-peritoneal method, and my results over a limited experience were extremely good. Like others, however, I was so impressed with the overwhelming experience of Mr. Wells, that I resorted to the clamp, and my results with it were so bad, that its employment will ever be to me a matter for bitter and lasting regret."

Minor's plan of enucleation has been resorted to by the author three times, but he thinks it by no means easy of performance, and says it always gives rise to hemorrhage.

It should be stated that of a series of one hundred cases treated with the ligature, and without antiseptics, only two proved fatal! "and in both cases death was due to the fact that they had been repeatedly tapped."

The most interesting and the most important part of this work is that in which the author sets forth his theory and practice in regard to the antiseptic system of surgery. If all the details of Listerism are unneces-

sary, then they should be abandoned, if for no other reason than as being, one and all, a departure from that simplicity which is the measure of perfection in operations. Mr. Tait believes them to be not only useless, but injurious. But, first of all, he fully recognizes the potent influence of septic poisoning; and emphasizes the necessity of avoiding infection, in language which cannot be made stronger:—

“There is no operation in the whole range of surgery where the patient seems to be so apt to be infected by septic influences, and no precautions against them can be too great. For any surgeon to perform an ovariotomy while he is engaged in dissection or in the performance of post-mortem examinations, or while he is attending any case from which he may be likely to convey septic infection, should therefore be looked upon as a professional offence of the gravest kind.”

“ . . . In my opinion any man who deliberately performs an operation under circumstances from which his patient acquires fatal blood-poisoning ought to be the subject of a criminal indictment.”

The germ theory of putrefaction is fully accepted to this extent, that no process of putrefaction occurs without the admission and presence of germs or species of the minute living organism, which are always found associated with the putrefactive process. But thence the author makes a wide departure. It is only in dead tissue that these germs are operative; they have no power over the living.

“ . . . No one has yet pretended that, by the admission of germs to living matter, he has produced the phenomena of the putrefactive changes which constantly result in matter which is dead.”

“ . . . There is not the slightest particle of evidence that they [germs] do produce any change whatever upon living tissue, still less is there any evidence that the changes which occur in the numerous varieties of what we call blood-poisonings, even when they are undoubtedly of a local origin, have the slightest analogy to those seen in a putrefying dead infusion.”

He then makes the powerful argument that if these germs, so numerous and so ubiquitous, were the cause of septicæmia and death, these results would necessarily follow any solution of continuity of the skin, and that there would be some approach to the ratio of mortality between minor and major operations as there is not now.

“Amputations of the finger and of the thigh ought to have approached one another in mortality to an infinitely larger extent than they have done.”

“The ordinary hypodermic syringe will inculcate inevitably a sterilized solution of dead organic matter, but amongst the hundreds and thousands of hypodermic injections which are made daily no one has yet declared a single instance of putrefactive changes resulting from it in the healthy, or even in the diseased human body.”

“The slightest cut of the skin ought to be followed by septic poisoning. There ought to be no difference in the mortality of operations in small and in large hospitals in town or country. In fact, if germs could have had the unbounded influence which is claimed for them by many antisepticists, surgery must long ago have been an extinct art, if, indeed, it ever could have struggled into existence.”

But the author does not merely enter a verdict of “not proven” as to the antiseptic system. He opposes it and charges upon it, as some others have done, direct injurious influences. He has seen one case of death which he attributes to thymol, one to carbolic acid, and dangerous symptoms in several. He quotes and endorses Keith to the extent that Listerism will add two or three per cent. to the mortality of ovariotomy. He finds other less obvious sources of evil. A belief in the efficacy of anti-

sepsis will lead to the undertaking of the operation by hands bathed in purulent or septic fluids; others will be seduced into doing it by "the fulness of its promise as a royal road to surgical success;" but "even an antiseptic spray will not condone the want of manipulative dexterity, or the absence of readiness in emergency."

There are three factors of success in operative surgery, the condition of the patient, his surroundings, and the nature and the extent of the operation performed. It is in this trinity, the author maintains, that the varying mortality after operations finds its explanation.

How, then, is the wonderful success in ovariectomy which followed the introduction of Listerism to be explained? As to Mr. Keith, with his eighty-odd consecutive recoveries, as he himself has abandoned the spray, we need not stop to explain. Mr. Tait disposes of Spencer Wells and his statistics. It has already been seen that to the introduction and use of the clamp by Mr. Wells is charged the maintenance of a high rate of mortality after ovariectomy, and a retardation of the progress of the operation. Mr. Wells abandoned his faulty mode of treating the pedicle at the same time that he adopted the antiseptic system, and, according to the author, it is to the former instead of to the latter fact that his increased success is due.

"Nearly concurrently with his [Wells's] adoption of germicides he adopted the intra-peritoneal method of dealing with the pedicle, a method which has been superlatively successful in the hands of Dr. Keith, and to which, chiefly, I attribute my own rapidly increasing success. Thus, Mr. Wells's mortality improvement argues nothing in favor of antiseptics, but far more, in my opinion, for the short ligature."

"Mr. Wells . . . now attributes his diminished mortality to the introduction of antiseptics. There is this difficulty, however, left for him to explain: his mortality now is double that which Dr. Keith had secured before he used antiseptics at all, and at a time when Dr. Keith's experience was little more than a fifth of what Mr. Wells's is at present."

It is evident, in this book as well as elsewhere, that Mr. Tait does not like Mr. Wells or his methods.

The author, then, uses no antiseptic measures as generally understood, neither spray nor carbolic acid, nor thymol; simple cold water in which to place his instruments and ligatures, and this is all; and this only as "an easy and effective method of keeping them clean." It remains now to give his success with and without antiseptic measures, for, of course, volumes of theory are valueless compared with actual results obtained. We are compelled, therefore, to complete the argument, and, in justice to the author, to present the following table of the entire results of his practice up to the time of writing:—

	Cases.	Mortality.
Non-antiseptic ligature	187	3.74 per cent.
Antiseptic "	52	3.84 "
Clamps—non-antiseptic	36	25.00 "
" antiseptic	26	27.00 "

Under the head of antiseptic ligature it is stated that there were twenty-two consecutive recoveries, but in them the Listerian process was not complete, only dry cotton-wool being used for dressing. If these cases had gone badly, he justly says that the antisepticism would not have been accepted. Placing these then with the non-antiseptic cases, and it gives a mortality of three per cent., and leaves to the antiseptic class 30 cases,

with a mortality of 6.6 per cent. In a table at the end of the chapter are given full particulars of each case—as residence, date of operation, name of medical attendant, etc., which preclude all cavil as to reliability of the statistics.¹

Mr. Tait's judgment and practice as to anæsthetics will naturally be looked for with the deepest interest by every operating surgeon. He devotes considerable space to the subject, and his decision is strongly in favor of ether. His mode of administration is the simplest possible—by dropping on a single fold of towel laid on the patient's face. The only objections to this plan are the minor one of waste of material, and the major one of covering the countenance, which should always be watched during the administration of an anæsthetic. Singularly enough, his experience as to the far less amount and frequency of vomiting after ether as compared with chloroform does not accord with Keith's; and as he has not found so much sickness after other operations, he believes that the constriction of the pedicle has something to do with this symptom after ovariectomy. He states the number of administrations at between five and six thousand, and in a foot-note states that he has had one accident.²

He recognizes fully the danger of bronchitis to old people, and has devised and figured an inhaler for warming the vapour as it is administered. The apparatus is certainly cumbersome, and the end is better attained by Clover's lesser inhaler. In addition, we suggest, that it is bare assumption that temperature is the only element of danger in these cases. It is singular, too, that over fifty pages of the book intervene between consideration of ether and the following paragraph, which we should certainly move up in juxtaposition:—

“Once or twice, after the removal of very large tumours from elderly women, I have seen a short, rapid cough set in, rapidly increasing in severity, and killing the patient in about thirty hours. What had occurred was, I believe, perfectly analogous to the suffocative catarrh of old age.”

There is no mention of a hypodermic injection of narcotics preceding the anæsthetic. If there was, we think that straps to bind the patient's arms and legs to the table would not be among the preparations for operating. We have no statistics that will make any approach to those of Mr. Tait, but so far as they go, they would scarcely show an instance of a patient ever moving an extremity during ovariectomy.

The sixth and last chapter, the shortest of the book, is by no means the least interesting or important. It is on “Recent Extensions of Abdominal and Pelvic Surgery,” and gives an account of the author's operations in the abdomen other than ovariectomy. Chief among these is “removal of the uterine appendages.” Extirpation of the ovaries alone he limits to a very narrow line of cases. This is “Battey's operation,” or “normal ovariectomy,” to both of which terms he objects, to the latter especially as tending to encourage the misrepresentation that healthy ovaries are removed upon very slight grounds. This operation he would restrict to those cases “in which there is no physical evidence of pelvic disease, yet where there are serious symptoms so intimately associated with menstruation as to

¹ In a paper published in the British Medical Journal, February 17, 1883, giving an account of two hundred and eight consecutive cases of abdominal section, the mortality is: for exploratory incisions and incomplete operations, 5 per cent.; for ovarian and tubal operations, 112 cases, 2.6 per cent.; for removal of uterine appendages, 39 cases, 12.8 per cent.

² The reference is to British Medical Journal, July 14, 1882.

lead us to believe that an arrest of that function might cure or relieve the patient by the establishment of a premature menopause." Thus far this class includes but five cases, all for one disease—epilepsy. When it comes to operating for intractable hemorrhage, the author lays stress upon the removal of the Fallopian tubes as well as the ovaries—all the "appendages" are taken away; and this is the novelty of his operation, and for which he claims credit. He believes, indeed, that "removal of the Fallopian tubes is more important than removal of the ovaries, and in by far the larger number of my cases that alone might have sufficed; indeed in many it has done so." For hemorrhage caused by uterine myoma he therefore rejects hysterectomy and enucleation, quoting Duncan and Gusserow that the mortality of the former is seventy per cent., and of the latter fifty. He rejects, too, palliative treatment by intra-uterine injections of styptics, and we are not surprised, for he has had "*three deaths from it in some ten or eleven cases!*" Removal of the ovaries and the tubes is comparatively safe, affords a security against relapse, which enucleation does not, and avoids the dangers of extirpation of the uterus. Of this class he reports forty-five cases, giving all particulars necessary for verification, with two deaths.

The next class consists of cases of hydro- and pyo-salpinx, the pathology of which has already been given, the importance of which has long been recognized, but for which, until now, no rescue has been offered from the severe suffering and prolonged invalidism they entail. Of this class forty-five operations are reported, with two deaths.

"The operations are generally very difficult, for it is quite exceptional not to find the tubes and ovaries densely adherent to the viscera and the pelvic wall, and in some the difficulty in overcoming these adhesions has transcended anything I have ever seen in the removal of cystic tumours of the ovary. In some cases the hemorrhage during the operation has been alarming. . . . In three of the cases the diseased organs have been removed only at a second attempt; that is, in my early practice I had not the courage and necessary dexterity to complete the operation. . . . In one case I made three attempts to remove the tubes, the third being successful."

This operation, therefore, will probably not be abused as some others in gynecological practice have been by that large class who, with a thirst for notoriety, rush in where better men tread with circumspection.

Then follow two tables of forty-four cases of removal of the uterine appendages, for hydro- and pyo-salpinx, all successful.

The author's experience with hysterectomy extends to eight cases, dates, and names given, all successful. He contrasts this with Mr. Wells's statistics as given in his recent work, thirty-nine cases, twenty deaths, and attributes his results to the treatment of the pedicle with his wire clamp instead of with the ligature. For uterine excision the ligature is as bad as it is good in ovariectomy.

"It seemed to me more than curious to see Mr. Wells deserting the clamp in the very field where its use is promising to be an advance, after he had used it for twenty years in a field where it was a detriment and a hindrance to all progress."

Next follows a list of other operations, without particulars, which shows wonderful results. There are 8 nephrotomies, 10 hepatotomies for hydatids, 20 laparotomies for pelvic abscess, 10 for peritonitis, acute and chronic, 7 for extra-uterine pregnancy, and others, in all 65 cases with one death!

"By no means the least satisfactory groups in the above list are those of acute and chronic peritonitis. In these cases absolute cures have been effected in every instance, by the simple plan of opening the peritoneal cavity, cleaning it out, and draining it for a short time."

Looking over these results, so brilliant, reading, as we do in one place, that three times, in performing ovariectomy, his knife has gone through the bladder, yet the viscus has been stitched up and no harm resulted, the suggestion rises that the operator must have some charmed talisman. Surely he wears the cap of Fortunatus! A genial friend suggests that henceforward the Japanese must abandon their time-honoured customs—*hari kari* is no longer a dangerous process!

Based upon such an experience and supported by statistics the author is justified in the tone of exultant confidence with which he presents the following:—

"So fearless am I now of abdominal surgery, so splendid have been my results in fields of practice which, until three years ago, seemed hopelessly inclosed, that I venture to lay down a surgical law, *that in every case of disease of the abdomen or pelvis in which the health is destroyed or life threatened, and in which the condition is not evidently due to malignant disease, an exploration of the cavity should be made.*"

We have aimed to present the author's surgical work, his methods and results, rather than to criticize the book in which they are laid before us. We are obliged to say that in many respects it is not above criticism. That it will receive it there cannot be a doubt, for Mr. Tait himself is not a mild critic, and when he charges upon the surgeons of a hospital of world-wide renown, as he does on p. 153, the killing of a patient, both by direct and indirect measures, he must expect the returns that such charges always excite. Allusion has been already made to the blemishes inevitable from the manner in which the book has been made up, by patchwork added to a former essay. Nor would we be severe upon this point, for the profession is too much indebted for the publication of experience by busy men like the author, and ought to welcome it upon any terms. When, however, important practical points are left obscure, or even directly opposite statements made in regard to them, the case is different. As instances we refer to the ambiguity if not widely different opinion as to the significance of bilious vomiting after ovariectomy. Take also the following as to temperature and pulse after the same operation:—

"I attach less value to the temperature curves than to the pulse curves."—p. 279.

"There are many dangers in the path of every patient submitted to this operation, and there are many indications of their approach, but none so trustworthy as those derived from a close observation of the patient's temperature curve."—p. 313.

There is about a page on each subject to the same intent of which, for want of space, we give only a specimen sentence.

We should be less than human did we fail to say a few words in vindication of our countrymen. Dr. Battey's claims seemed first to demand it. It is well known that the operation known by his name was performed by two other surgeons, Hegar and Mr. Tait, a very short time before he did it, but that he preceded them both in publication. On page 107 we have the direct statement that "Dr. Battey's publication was also subsequent to both of ours." On page 326 we have the equally direct statement that "Dr. Battey was the first to publish his cases, and a defence of his pro-

ceedings, 1872, while I contented myself with disussing the principle only in my *Hastings Essay*, 1873." So Dr. Battey stands vindicated!

Again, Mr. Tait gives a sketch of the history of ovariectomy which is partial, partisan, and unjust beyond measure. Not a word is said of any operator on this side of the Atlantic after Nathan Smith. He does not mention the name of Atlee, who began operating as soon as Clay, and whose tables and suggestions it suited a London surgeon to publish as his own. It is no less than an attempt to rob this country of the honour of being the birth-place of ovariectomy, and to deny to Ephraim McDowell the merit of having made this great advance in surgery. Houston, of Glasgow, is the one who, according to Mr. Tait, was the first to successfully remove a diseased ovary! He prides himself upon presenting additional information in regard to Houston, obtained from a resident of Glasgow. But nothing can go back of or beyond Houston's own report of his own case, and it was a singularly clear and minute one for those days. He himself does not head it "removal of an ovary" but calls it a case of dropsy in the left ovary cured by a large incision made in the side of the abdomen! Mr. Tait's argument presents some of the most striking instances of special pleading we have ever encountered! Thus, he insists that Houston must have tied the pedicle because he says the tumour was on the left side! Yet Houston himself says nothing of seeing or tying a pedicle although his account is so minute that it includes the number of stitches put in and the kind of bandage applied! To Hunter belongs the honour of having first suggested the possibility of ovariectomy, yet Mr. Tait would rob him of it to support his claim for Houston. Hunter, he says, "must have known of Houston's case." Then why did he not simply say that ovaries could be removed because Houston had removed one, instead of arguing that a woman might suffer spaying as an animal does? And why does Mr. Tait's suggestion, so ready at hand in regard to most of the early operations, that only parovarian cysts were removed, fail him here? And then we read that McDowell was a Scotchman! Born in Virginia, his mother a Virginian, his paternal ancestors emigrating from the north of Ireland nearly forty years before he was born, and yet he is a Scotchman! -

"My American readers may object that McDowell was not born in Scotland. Of this, however, we are not yet clear. At any rate his father and mother were Scotch, and at the time of his birth, 1771, *the States did not exist!*"

We should have deemed it impossible to be obliged to attach the term puerile to anything that Dr. Lawson Tait might write, but this is certainly nothing better than that. And to justify the charges we have made as to his history, we quote the following:—

"It is quite true that McDowell was the first to do a number of ovariectomies, and it is equally true that Houston was the first successfully to remove a diseased ovary, but it was Clay, of Manchester, who first showed that ovariectomy could be made an operation more justifiable by its results than any of the major operations of surgery!"

And this is written with full knowledge of the fact that McDowell saved eight cases out of thirteen, and almost on the same page that Clay's mortality is stated at twenty-five per cent.!

We give all honour to Mr. Tait as a bold and successful operator, and as a skilful diagnostician, but as a historian he will not bear examination.

J. C. R.

ART. XIX.—*Annual Report of the Medical Officer of the Local Government Board for the year 1881.* London, 1882.

ANOTHER volume, the eleventh, has been added to this valuable series of reports. Dr. Buchanan, the medical officer of the board, discusses the influence of the compulsory vaccination law, and illustrates its beneficial action by the smallpox statistics of London for the year 1881. In connection with smallpox prevention we learn that a commencement has been made in the propagation of bovine virus for issue to practitioners from the National Vaccine Establishment. The original plan of this establishment provided for the collection of humanized virus by certain approved public vaccinators, whose operations were to be conducted under supervision, and the issuance of the matter thus collected; but in July, 1881, arrangements were made for the propagation of the vaccine in the calf. Stock from the Hague was first employed, but in March, 1882, it was given up in favour of virus from Bordeaux. This lymph is sent out for the commencement of a local series of arm to arm vaccinations, and physicians using it are cautioned:—

“1st. That, as compared with humanized lymph, calf lymph is much less easy of removal from the ‘points.’”

“2d. That such lymph does not ‘take’ with the same degree of certainty as humanized lymph.

“3d. That the course of the early vaccinations of a series is not so regular as with humanized lymph.”

Bovine points are a more familiar article in the United States than in England; and our health officers and public vaccinators have pronounced in their favour for general vaccination, and not solely for commencing a series of arm to arm operations. It would be well, however, if we followed the example of the English in instituting some supervision over the production of this important agent in the prevention of contagious diseases. A bill looking to a warranty of purity by the National Board of Health was lost during the past session of Congress.

Some interesting investigations into special outbreaks of disease are reported. Scarlet fever was traced in Halifax to the distribution of milk from a dairy where the servant, who milked the cows, lived in a cottage crowded with cases of the disease. In a scarlatinal epidemic in Durham a distinct interval existing between the cases occurring in the same family showed that the propagation was by personal intercourse, and not by any common influence of food-supply, or the like. The establishment of hospitals is urged as the first and most essential of the means necessary to prevent the spread of the disease.

Typhoid fever at Blackburn was traced to contamination of the water-supply by oozing from infected privy-pits. At Melton Mowbray a typhoid epidemic, which appeared to have no connection with the water-supply, as it was localized in a certain particular part of the town, was referred to the choking by floods of a badly ventilated section of the town sewers. This choking was repeated on three occasions, and was followed each time, at an interval of two weeks, by an aggravation of the epidemic.

An outbreak of smallpox among rag-sorters at a paper-mill led to an examination of sanitary and medical literature for instances in which infection has been communicated by rags, which showed that cases of

infection by this means do occasionally occur, although, comparatively speaking, not very frequently; and that smallpox is the disease most likely to be thus conveyed.

In view of prevalent rumors of trichinous disease in imported pork the board issued a memorandum or circular to sanitary authorities throughout the kingdom insisting on thorough cooking as a means of security against injurious effects.

"Hams, sausages, and like articles, whether or not they have been smoked or salted, should never be eaten in the raw state. To be efficient for the required purpose, the cooking of pork, of hams, of bacon, and of other articles should be prolonged for about half as much time again as is customary. The smallest joint should be cooked for not less than an hour; and whatever be the size of the joint it should have not less than half an hour's cooking for each pound of meat. No part of a joint that is seen to have an underdone portion in it should be eaten."

In a short time public anxiety was quieted, and the board, with all its opportunities afforded by its relations with local health authorities, did not hear of any trichiniasis occurring among the English population.

The propriety of having greater uniformity and comparability among the forms in use by health officers is shortly discussed, Dr. Buchanan's conclusions being that the local usefulness of these reports is always the first object to be sought, and that a uniformity which puts local circumstances into the background is not to be desired.

"Conditions of soil or of water-service in one district, occupational conditions in another, circumstances of race or habit in a third, will claim to be more especially considered in connection with the greater or less prevalence or fatality of one and another kind of disease. . . . Uniformity of tabulation, to the extent of setting aside a health officer's personal preferences for the sake of serving a common object, is unquestionably to be sought; but the end now desired can, I think, be better attained by health officers in counsel with each other, as in local societies, than by the appointment, by a central office, of forms professing to be adapted to all sanitary districts of the kingdom."

The subject of water analysis meets consideration in a paper by Dr. Cory giving the results of an inquiry undertaken mainly to ascertain how far some of the processes in common use among chemists, for the analysis of water, could be relied upon for the detection of dangerous pollutions. Minute quantities of typhoid excreta and other foul and dangerous matters were mixed with Lambeth Coy-water, and specimens of the water thus contaminated were examined by Professors Frankland, Dupré, and Wanklyn. A similar investigation was in progress at the time in this country, conducted under the auspices of the National Board of Health by Prof. Mallet of the University of Virginia.

The inadequate support given to the board by the national legislature has interfered with the publication of the details of Prof. Mallet's work; but from an abstract of the unpublished report, which appeared as a supplement (No. 19) to the *National Board of Health Bulletin*, it is evident that the American undertaking covered a larger field, and entered with greater detail into the various questions which were opened up during the progress of the work. The English investigations did not even discover that urea is broken up into albuminoid ammonia when treated with alkaline permanganate. In general, the conclusions of the Cory and Mallet reports are similar. The Frankland or combustion process is considered to give accurate results so far as the quantities of the organic elements, carbon, and nitrogen are concerned, but the permanganate oxidations

and the albuminoid process are acknowledged to give valuable and practically useful information concerning these elements. Nevertheless, it is found that none of the processes can determine aught concerning the wholesomeness or unwholesomeness of a given water. The chemical results obtained from a water polluted with the specific poison of typhoid fever do not differ from those yielded by other organic pollutions of even a harmless nature. It is interesting to observe, however, that the English and American authorities make very different deductions from their similar results. Dr. Buchanan, in commenting upon Dr. Cory's report, says:—

“The lesson is taught afresh and significantly that while we must ever lie on the watch for the indications that chemistry affords of contaminating matters gaining access to our waters, we must (at any rate until other methods of recognition are discovered) go beyond the laboratory for evidence of any drinking-water being free from dangerous organic pollution. Unless the chemist is well acquainted with the origin and liabilities of the water he is examining, he is not justified in speaking of a water as ‘safe’ or ‘wholesome,’ if it contain any trace whatever of organic matter; hardly, indeed, if it contain absolutely none of such matter appreciable by his very delicate methods. The chemist can, in brief, tell us of impurity and hazard, but not of purity and safety.”

Dr. Buchanan's point of view is that of public health. On the other hand, Dr. Mallet lays greater stress on the fact that a water need not be condemned on account of the chemical results of its examination, because these results may be obtained from harmless organic materials; his point of view being rather that of the water companies and moneyed interests. Thus he says:—

“It will not do merely to throw all doubts on the side of the rejection of a water, as has been more or less advocated by writers on water analysis, for there are often interests of too serious character involved in such rejection to admit of its being decided on, save upon really convincing evidence of its necessity. In view of the great and increasing difficulty of securing an adequate supply of water of satisfactory character for very large cities, is it an unpractical fancy that there may yet come to be provided a double supply through separate pipes: 1st, of water for drinking and cooking purposes only; and 2d, of water less carefully selected as to source and storage for bathing, washing, house and street cleaning, extinguishing fires, etc., the former at any rate dispensed through meters to regulate consumption?”

The densely peopled areas of England and the greater probability of specific infection accompanying the pollution of a water by animal matters no doubt have led the authorities of that country to look at the danger rather than at any of the other sides of the water question; while our, as yet, different conditions may be considered as authorizing Prof. Mallet, in certain cases, to give the benefit of the doubt to the water.

Dr. Klein in his researches into the mutations of micro-organisms has found reason, while studying the anthrax bacillus, for attaching importance to the occurrence of spore formation. An altogether new virulence is developed by the material as a consequence of the formation of spores in its bacilli; and this formation has been demonstrated to be largely a matter of definable circumstance and condition. Dr. Klein made many successive cultures, after the manner which Pasteur and others believe to produce attenuation of virus, but did not discover any indication of such a loss of intensity as would allow of the material of a late cultivation being put into the body of an animal without killing it, or doing it serious injury, but with the result of thenceforth protecting it against death by anthrax when the poison of the original disease is inoculated into the animal.

"Thus, Dr. Klein, without throwing doubt on the discovery by Pasteur of a material protective against fatal anthrax in the sheep, would guard his reader against generalizing from Pasteur's experience, and against inferring from it that an 'attenuated' virus can be had by the recognized method of successive cultivations in organic liquids at 42° C. There is something more than this wanted for the production of Pasteur's anthrax 'vaccin,' and the conditions for it have not transpired from M. Pasteur's laboratory."

Another valuable paper, on the subject of micro-organisms, is that of Mr. Horsely of University College. This gives an admirable presentation of the state of our knowledge concerning the septic bacteria. It summarizes the principal experimental facts bearing upon the physiological relations of these vegetable organisms, giving an account of the life-history of the septic bacteria and of the chemical poison, which appears to be the result of their vital activity. A copious bibliography is appended, which will be valued by the student who desires to enter this interesting field of experimental research.

C. S.

ART. XX.—*Transactions of the Obstetrical Society of London.* Vol. XXIV., for the year 1882. 8vo. pp. 339. London: Longmans, Green & Co., 1883.

THE volume under review is one of the smallest issued by the society, and contains but few papers of any length or special interest. As several of these have been already noticed in this Journal, we shall confine our remarks to the remainder. The volume is largely composed of short clinical records of cases presented at the meetings, with or without pathological specimens; comprising those of uterine fibroids, 8; ovarian tumours, 5; diseased or abnormal placenta, 5; extra-uterine foetations, 4; monsters, 2; hermaphrodites, 2; deformed pelves, 2, etc.

The first paper we shall notice, is that of Prof. W. S. Playfair, on page 84, entitled *Notes on Trachelo-raphé, or Emmett's Operation*. So much has been written upon this form of uterine restoration and its importance to female health, by American gynecologists, that it will suffice to give a few extracts. The operation, although extensively performed in this country, is new in Great Britain, where it has been received with much prejudice. Having been admittedly performed in our country in many instances where it was not imperatively required, the English have gone to the other extreme, and are many of them inclined to deery the operation, even in cases in which experience has shown that it is alone capable of effecting a rapid and permanent cure. As it is now twenty-one years since Emmet first operated, it seems strange that so little has as yet been done to test the value of the method in England; although this has been accomplished to the satisfaction of several prominent gynecologists on the continent. Dr. Playfair says:—

"Some eighteen months ago I was in the position in which, I doubt not, many in this room are at this moment. I was familiar with the writings of Emmet, Thomas, Goodell, Mundé, and others, on trachelo-raphé, but I was very unwilling to admit that I had been for years misunderstanding my cases, and I looked upon their statements as exaggerated, and was in fact strongly prejudiced against them. My attention having been drawn to the subject, I got more and more into the

way of using a duck-billed spoon and tenacula, and I was soon forced to the conclusion that the facts at least on which the operation was based were accurate, and that lacerations did in truth exist with a frequency little less than the American writers stated. So strong, however, were my former views or prejudices, that I was not induced to try the operation. About this time, a patient who had been from time to time under my care, sometimes a little better, then bad again, but never permanently well, went on a visit to America. There she consulted some one who performed trachelorrhaphy, and she came back in a few months with an apparently virgin cervix, and with all her old symptoms perfectly cured, and so they have remained ever since. This case was in some sense a revelation to me, and I determined to put the matter to the test of practice, I accordingly sent to New York for the instruments used by Emmet, and I have since performed the operation about twenty times, with the result of satisfying myself that there is at least a large foundation of fact in the views so ably propounded by Emmet, and that although the operation may at present be rather overestimated in America, it is one of great and unquestionable value, which enables us permanently to cure many intractable cases, and which is quite sure ere long to take a prominent place in scientific practice in this and in every other country."

With regard to the opinion advanced by many gynecologists, that the existence of a laceration of the cervix tended to give rise to the formation of epithelioma, a view held particularly by Emmet, Goodell, and Breisky, Dr. Playfair writes: "When I was thinking over the matter a good deal, and before I had ever operated, I saw a patient with my friend Mr. Bexley Thorne, who had amongst other local states one of the most distinct unilateral lacerations I ever saw. I pointed this out at the time of our consultation, remarking that if this patient had been in America she would certainly have been operated on. I heard no more of this case until May of this year, when I was again asked to see the patient, on account of some recent metrorrhagia, and on examination I found the portion of the cervix where the laceration had been situated occupied by a mass of epithelioma as large as a turkey's egg. This I excised, cauterizing the base of the tumour with chloride of zinc, and with a very favourable result, there being as yet no appearance whatever of the recurrence of the disease. In reference to the theory I have mentioned, this case is certainly curious. Had I seen it with my present knowledge, I would probably have performed trachelorrhaphy, since the case was one which in other respects fully justified it, and might thus possibly have saved the patient a great risk." Dr. Playfair then related some of his cases to show the remarkable results of some of the operations performed by him.

The discussion of the paper showed, as its author had stated, the existence of a great deal of prejudice against the operation; and evinced an indifference to give it even the benefit of a trial on the part of some of the Fellows. Several had tried the operation; some were pleased with its results; others disappointed; but no one had had the experience with it that Dr. Playfair had had as an operator, or valued it so highly as a surgical expedient. The President of the Society, Dr. J. Matthews Duncan, was particularly marked in his opposition, and said that he was not impressed in favour of the operation by what he had heard.

On the Natural History of Dysmenorrhœa, by JOHN WILLIAMS, M.D., is a paper based upon observations made in 1944 cases; of this number, 874 suffered from primary dysmenorrhœa, and 22 from acquired pain, only 11 of which latter were properly cases of dysmenorrhœa, and were due to fibrous polypus in 1 case; to fibrous tumour in 4 cases; perimetritis including ovaritis in 3; movable kidney in 2; and hemorrhoids in 1 case.

Of the 874 subjects, 681 were married, of whom 581 bore children and

100 were sterile. In 122 of the fertile women the pain became much less after child-bearing, and in 177 it was not any better. Of 419 cases in which the quantity of menstrual fluid was noted, 192 menstruated in very small quantity, 54 in moderate, and 166 profuse.

The author draws from his observations the following conclusions:—

1. The disease in a few rare cases ceases spontaneously in a few years after puberty.
2. If the woman continues sterile, marriage generally aggravates the disorder.
3. Child-bearing cures a large number of cases.
4. The subjects of primary dysmenorrhœa are sterile in the proportion of one to twelve.
5. Menstruation is regular in about two-thirds of the cases.
6. It is profuse in about two-fifths of the cases, and scanty in about one-half.
7. The uterus is imperfectly developed.
8. The results of the disorder are slight hypertrophy of the uterus, erosion and eversion of the mucous membrane of the cervix and catarrh. The uterine cavity rarely measures more than $2\frac{1}{2}$ inches in length.
9. The hypertrophy is attributable to increased muscular action at the menstrual periods.
10. Ovaritis and perimetritis are possible consequences of dysmenorrhœa.
11. Pain results from uterine spasm, excited by the separation and expulsion of shreds of decidua and clots.

Mr. HOPKINS WALTERS, of Reading, exhibited at the meeting on June 7th, a *Uterus torn away by a Midwife, in a Case of Retained Placenta, with recovery of the patient*. As quite a number of recoveries after this form of malpractice are on record, it will be of interest to note the anatomical character of the parts removed viz:—

“In front, the separation between the uterus and vagina had been effected at their line of junction, and the vesico-uterine reflexion of peritoneum was torn obliquely from the left side, close to the uterine wall, across to the right side, one and a half inches from its uterine attachment; and from this portion hung a narrow strip of peritoneum five and a half inches in length, which had apparently formed part of the peritoneal covering of the bladder. Behind, a semicircular flap of the posterior vaginal wall, about one and a half inches in length, remained attached to the uterus. Near the junction of this with the cervix was a bruise and partial laceration, as if a finger had almost penetrated the vaginal wall at this point. The utero-rectal reflexion of peritoneum was detached along the uterine wall.”

“On the left side of the uterus remained half an inch of the ligament of the ovary, one inch of the Fallopian tube, and about four inches of the round ligament; the broad ligament, excepting its extreme upper and lower uterine attachments, having been left behind with the ovary and the rest of the tube.”

“On the right tube, the broad ligament was entire, having been torn from its pelvic attachments, and contained four and a half inches of the round ligament, and the Fallopian tube with its fimbriated extremity. The uterus was well contracted and empty, the placenta having been expelled during the manipulations of the midwife.”

“Accompanying the specimen was a piece of omentum about twelve inches in length, that had been prolapsed, and was removed.”

The subject of this fearful injury, strange to say, made an excellent recovery.

Mr. LAWSON TAIT reports eighteen operations for *Removal of the Ute-*

rine Appendages, performed by him in the space of seven months, without a death. The diseases for which he operated were as follows: Double hydrosalpinx, in 5 cases; double pyosalpinx, 9 cases; hydrosalpinx in right Fallopian tube, and pyosalpinx in the left, 2 cases; and chronic ovaritis with adhesion of the appendages in the *cul-de-sac*, 2 cases. In most of the cases menstruation was profuse, and in two it was hemorrhagic. In 14 women, the ages ranged from 28 to 38, and in four, from 43 to 69.

Cases of Transverse Septum in the Vagina.—Of these, one *perforate*, is reported by HENRY GERVIS, M.D., and one *imperforate*, by J. MATTHEWS DUNCAN, M.D., the ages of the women being 22 and 21 years respectively. In the Gervis case, the vagina appeared to end in a *cul-de-sac* at from an inch and a half to two inches from the vulva, and the menses escaped through a septum, apparently about a line in thickness, by a small orifice on the left side. In the Duncan case, the septum was imperforate, and was forced downward against the hymen by an accumulation of menses, forming a convex protrusion in the vulva. In each case the hymen was annular and well defined. Both were operated upon successfully by the thermo-cautery; and in the latter, about three pints of retained blood escaped, one half immediately, and the balance gradually during five days. No pressure was made on the abdomen, and no wash injected per vaginam. The menstrual blood had no fœtor at any time. In the Gervis case, the menstruation was painless; but some retained blood was found, and the cervix was eroded. The woman applied to be treated for a persistent and considerable leucorrhœa. Local treatment after the operation produced a cure of the erosion, and leucorrhœa.

Mr. ALBAN DORAN reports 5 cases of *Interstitial or Tubo-uterine Gestation, with Notes on Similar Cases in the Museums of London Hospitals*:—

Case 1. Woman 32, mother of two children. Cyst burst at about two months; patient lived twelve hours.

Case 2. Cyst of the same character as No. 1. Rupture and death at two months.

Case 3. Rupture of cyst when fœtus measured four inches.

Case 4. Rupture at four months.

Case 5. Rupture at seventh week; woman died from hemorrhage in twenty-four hours.

"Interstitial pregnancy generally ends in a fœtal cataclysm, at the second or third month," as in cases Nos. 1 and 2. "The tendency to early rupture of the cyst involves, of necessity, great difficulties in diagnosis." It is "clearly due to the thinness of the cyst towards its upper or peritoneal aspect." "I can well understand how the fœtus might be born into the uterine cavity, after expulsion from the sac, and then directly, or after an interval, delivered from the uterus."

This last opinion is based upon a *possible* progress of the fœtus toward the uterine cavity; which is simply a possibility, as the records of cases show, that the cyst thins in a contrary direction, and the fœtus escapes into the pelvic cavity. The *possibility* named must remain undecided, until proved such by autopsy. At present it is, at best, hypothetical.

Dr. J. MATTHEWS DUNCAN contributes a paper *On Puerperal Diabetes*. True diabetes is rarely associated with pregnancy, because the subjects of it seldom become pregnant, being, in fact, for the time, generally barren; but the disease may come on during the pregnant state; after delivery; or

during lactation, and gradually advance until it becomes fatal. The author gives, in illustration, the records of the cases of 15 women, comprising 22 pregnancies. One woman very exceptionally became pregnant three times, while diabetic, miscarried always in the fourth or fifth month, and died under the last labour. These 15 women varied in age from 21 to 38 years, and were all, as far as known, multiparæ with but one exception. In several death resulted from collapse. Of the 22 pregnancies in 15 subjects, four ended fatally after parturition. Excessive quantity of liquor amnii was common, and the fluid was found saccharine in one case. In 7, of 19 pregnancies, in 14 women, the fœtus died after reaching a viable age, and before labour; and in two more the children were asthenic, and lived but a few hours after birth. In a tenth case the fœtus was diabetic.

Dr. Duncan presents the following as his deductions from an examination of the whole subject:—

1. "Diabetes may come on during pregnancy."
2. "Diabetes may occur only during pregnancy, being absent at other times."
3. "Diabetes may cease with the termination of pregnancy, recurring some time afterward."
4. "Diabetes may come on soon after parturition."
5. "Diabetes may not return in a pregnancy occurring after its cure."
6. "Pregnancy may occur during diabetes."
7. "Pregnancy and parturition may be apparently unaffected in its healthy progress by diabetes."
8. "Pregnancy is very liable to be interrupted in its course; and probably always by death of the fœtus."

Where the urine of pregnant women in a hospital has been generally tested for sugar, it is not uncommon to find it in moderate proportion. This paper of Dr. Duncan opens a new subject for consideration; and may lead to the discovery that true diabetes is not so rare an accompaniment of pregnancy as has been supposed.

Treatment of Post-partum Hemorrhage by Hypodermic Injection of Ergotinine, by C. CHAIBAZAIN, M.D., of Paris.—Ergotinine was discovered in Paris, in 1875, by the distinguished chemist, Charles Tanret, who obtained it in the form of white crystals, insoluble in water, but soluble in alcohol and chloroform. It is believed to be the active principle of ergot, and exists in very small proportion, one pound of spurred rye yielding but three grains. The dose administered by Dr. Chahbazain was from $\frac{1}{100}$ to $\frac{1}{50}$ of a grain, a quantity sufficient generally to excite uterine contraction in from three to five minutes.

Twelve cases are reported to demonstrate the efficiency of the remedy in uterine relaxation and hemorrhage after parturition, in several of which ergot had previously failed when administered by the mouth. These tests of the drug were made at the Rotunda Hospital of Dublin, in August and September, 1882.

Epithelioma of Cervix Uteri complicating Pregnancy; Cesarean Section; Recovery of Mother; Child Living, by ARTHUR W. EDIS, M.D., F.R.C.P.—The patient was a 2-para of 29, and was operated upon in the Middlesex Hospital, on February 26, 1882, after a lapse of $17\frac{1}{2}$ hours. The uterus was sutured by introducing interrupted stitches of fishing-gut. A much larger proportion of patients has recovered in England after the Cesarean operation for cancer of the uterus than for any other form of obstruction to delivery.

R. P. H.

ART. XXI.—*A Treatise on Fractures.* By LEWIS A. STIMSON, B.A., M.D., Professor of Surgical Pathology in the Medical Faculty of the University of the City of New York, Attending Surgeon to the Bellevue and Presbyterian Hospitals, New York, etc. 8 vo. pp. 598. Philadelphia: Henry C. Lea's Son & Co., 1883.

HE is certainly a brave man who writes a new work on "Fractures," especially in our own country, where, for nearly a generation, "Hamilton on Fractures and Dislocations" has been in the hands of almost every student and general practitioner. Without an apology, explanation, or statement of "long felt want," Dr. Stimson has given his book to the profession to be judged upon its merits; to be received or rejected according as it does or does not present facts in a clear and comprehensive manner, enunciate principles correct in themselves and proper to be acted upon, and advise methods of treatment which will speedily and safely secure the best results.

More than one-third of the 600 pages of the book are devoted to the consideration of topics relating to fractures in general, their diagnosis, modes of repair, methods of treatment, complications, etc. What has been written is true and well expressed, but, as might naturally be expected, it is merely a restatement, in somewhat modified form, of what has been over and again expressed by others in general and special works.

Whenever proper opportunity presents itself the author's full faith in Listerism is declared, though the use of the spray is considered "not essential to the success of this method;" Markoe's "through drainage" is very favourably regarded, as also Guerin's "cotton-dressing;" of the use of which, however, in the treatment of fractures, Dr. Stimson states that he has had no experience.

Respecting the frequently declared predisposition to the occurrence of fracture produced by syphilis, it is definitely stated that this disease "has but little, if any, influence;" and a similar opinion is held of the direct action of mercury in rendering the bones more liable to break.

Of the use of plaster of Paris it is declared, with great truth, that "it is blind partisanship that claims for plaster success under all circumstances, and it is equally blind prejudice that holds it responsible for all complications that arise under it. Like any other dressing, it must be used judiciously, and not in a routine manner, and its limitations, as well as its merits, must be recognized. . . . It is well known that early reduction and perfect retention diminish materially the subsequent inflammatory processes; and, therefore, since the plaster-dressing is, in suitable cases, the most efficient means of retention, it should be applied at the earliest possible moment, and as the only danger is that of undue pressure, watchfulness ought to be a sufficient protection. The interposition of a thick layer of cotton is an absolute guarantee against this danger, but diminishes the accuracy of the retention."

Chapters IX. and X., on "*vices of union*" as respects degree, kind, and position, are among the best in the book. Internal remedies for the relief of delayed union "have not fairly established a claim to confidence," and when given "with a view to softening the callus and making its rupture easier, have no effect beyond causing the loss of valuable time;" the use of the descending constant current "as a means of stimulating the nutrition of the limb, and thus promoting the growth and consolidation of the cal-

lus," is advised; if the seton is used, after the method of Physiek, its early removal is recommended, since "an examination of the recorded cases shows that the dangers are increased, while its efficiency is not, by the prolonged retention;" resection, "in cases of real pseudarthrosis and disease of the fragments the only method that holds out much prospect of success" may, it is believed, "be stripped of most of its danger by strict antiseptic precautions." Osteotomy for badly united fracture the author, though he has never seen it used, feels sure would be "serviceable in cases of angular or rotatory displacement without such over-riding as would greatly increase the thickness of the bone at the point where the fracture would have to be made;" however, "when a choice can be made, forcible rupture is to be preferred to division by the saw." This latter statement certainly "admits of an argument."

Of the special fractures, those of the skull are first treated of; it being held that in these latter days, when, thanks to the antiseptic treatment, no special danger attaches to a break in a cranial any more than any other bone, such skull fractures should be looked at simply with reference to the osseous lesion, and not, as heretofore, to the associated, or likely to be developed affections of the brain or its coverings. Of the use of the trephine, it is held (and very properly so, we believe) that the mortality following it, "upon which its restriction is so largely based, is to be charged, not to the operation, but to the lesions whose symptoms finally led to it, after a delay that had deprived it of most of its chances of success." It is to be hoped that, in the near future, many careful investigations in various countries will be made to determine, if possible (as Mr. Walsham has lately attempted to do), the mortality, *per se*, of this operation, which has perhaps, more than any other, felt the effects of the pendulum-like vibration of professional opinion. The bedsores, so likely to form, and that quickly, after vertebral fractures are thought to be, in the main, due to pressure, and not to nerve lesion. In two cases of fracture in the lower dorsal region in adults the author reports having tried the plaster jacket, "but without benefit." Of trephining in fractures of the spine, we read:—

"While I believe that the danger of the operation has been considerably overstated by its opponents, and that it might be still further diminished by the use of the antiseptic method, still, as in many cases, the necessary change in the position of the parts cannot be effected, because the pressure upon the cord which it is desired to relieve is made in front by the inaccessible body of the vertebra, and as the diagnosis must always remain somewhat uncertain and incomplete, I do not believe surgeons will feel justified in undertaking it except under rare circumstances, such as fracture in the cervical region with a fair probability of finding that the pressure upon the cord is due to a displaced spinous process. In the dorsal and lumbar regions the fracture, even when due to direct violence, usually involves the body of the vertebra, and if pressure is made upon the cord in consequence, it is made in front and not behind, and its seat is outside the field of a prudent operation. It is certain that better results have been obtained by suspension and the plaster jacket, than by trephining, and if the promise held out by the few cases in which the former method has been tried should be confirmed by further experience, there would seem to be no reason to have recourse to the other."

In the chapter on fractures of the nose, we are pleased to find it stated that "the interval between the septum and the side of the nose at the part of the nostril corresponding to the nasal bone is small, so small that it will not ordinarily admit an instrument as large as a female catheter." It is certainly high time that the standard direction to lift up the depressed bone with a female catheter was dropped.

Fracture of the lower jaw is believed to be located most frequently "at or near the median line, and single fracture of the ramus or of the alveolar or condyloid process is comparatively rare." This belief is based upon the results of Gurlt's investigations, which are regarded as more worthy of acceptance than the estimates of other writers, who "differ much among themselves, and appear to have spoken in most cases from general impressions rather than from figures.

The commonly received opinion that "in indirect fractures caused by pressure upon or near the sternal ends of the ribs the bone would yield near its centre, at its point of greatest curvature," is pronounced "not supported by clinical or experimental facts. On the contrary, the fracture is found much more frequently in either the anterior or the posterior third, and indeed the point of greatest frequency seems to be very near that at which the force is received, an inch or two on the outer side of the sternal end of the bone." In the treatment of rib-fractures the generally employed bandage is regarded as "seldom more than a comparatively unimportant aid," the patient naturally and instinctively immobilizing the chest by careful breathing and favourable posture. In the sub-section on "fracture of the costal cartilages," no notice is taken of the excellent paper by Bennet, of Dublin (*Dub. Med. Jour.*, March, 1876), in which he reports six cases of this rare accident, two of them under his care, two found upon dissection, and two museum specimens. Possibly, had its author written in French, or lived in New York, the paper might not have been overlooked.

Of no one of the various methods of treating a fractured clavicle is any very high opinion entertained, since "the results obtained by the simple scarf, or sling, are as good as those furnished by the most elaborate bandaging, and the discomfort to the patient during treatment is much less. . . . If the tendency to displacement is great, the choice of a method of treatment will depend largely upon the character and wishes of the patient. If he is indifferent to the deformity or intolerant of restraint, it is useless to attempt more than a simple dressing; but if he is willing to submit to the confinement, the fracture may be treated by dorsal decubitus and digital pressure, with a fair prospect of success." The axillary pad is very justly, as we believe, condemned as either dangerous or useless.

In cases of fracture of the elbow early passive motion is unfavourably regarded; "if the joint is not inflamed passive motion is useless, and if it is inflamed, absolute quiet is what it most needs." Due notice is taken of Allis's "valuable and interesting paper," the theoretical grounds upon which his method of treatment rests, believed to be "entirely sound, and the practice to be free from objection whenever the extended position does not favour, as it sometimes does, dislocation of the forearm backward."

The plaster-of-Paris dressing in cases of fracture of the shaft of the bones of the forearm, is declared to be equally objectionable with the roller bandage directly applied, "for the same reasons [pressing together of the fragments and making dangerous constriction] during the first few days, and is to be avoided afterwards because it prevents inspection of the parts." None of these objections can lie against the use of plaster palmar and dorsal splints held in place by bands or the ordinary roller, and such splints much more accurately maintain proper apposition of the fragments than any other.

The low position of the line of break in fractures in the vicinity of the wrist-joint is duly pointed out; "the weight of testimony places it at from

one-third to three-fourths of an inch above the articular border." The great majority of these fractures are declared to be produced by "decomposition of the force and yielding at the weakest point," the "cross-strain" theory being regarded as the correct one only in a few exceptional cases. An attempt is made to prove anatomically that ordinarily the anterior ligament is not even made tense, "the first carpal row remaining in place and the second swinging around until it comes almost into contact with the radius." But the anterior carpal ligament is "connected with both rows, specially with the second row of the carpus, and with the fibrous tissue connecting the two rows with one another, *i. e.*, the anterior intercarpal ligament;" and if the second row did possess the power of backward movement independent of the first to the extent claimed, which is certainly questionable, still the anterior carpal ligament would be made tense and that in a degree sufficient to exert a powerful dragging force upon its radial attachment. It is further declared that "the strain does not come upon the ligament, unless the hand is caught under the body in the fall and bent far back." Garden has recently reported¹ a case in which the fracture was produced by a violent forcing backwards of the hand in an attempt at saving a child in the arms from falling, in which there was no fall, no catching of the hand under the body, nothing but simple over-extension. Though reference is made to Gordon's monograph, Lecomte's paper, published fifteen years earlier, is not mentioned, a paper in which the causation "*par arrachement*" was strongly insisted upon. It is gratifying to find our author declaring that, in these fractures in the lower end of the radius, "it is often impossible on account of the crushing, comminution, or impaction, to reduce the displacement completely, or to maintain the reduction, and that in such cases permanent deformity of the parts is inevitable." There is at the present day altogether too great a disposition even among medical men to regard deformity after fracture as evidence of want of skill or lack of care on the part of the attending surgeon; and every writer and every teacher should let it be clearly understood that only in a minority of the cases is the break recovered from without some deformity and impairment of functional integrity.

Fractures of the neck of the femur are classified as those "of the small part of the neck," and those "at the base of the neck," instead of intra- and extra-capsular. In cases of the first class, though fibrous union is ordinarily secured, the possibility of bony union is admitted; and treatment by immobilization is advised, that the connecting band in the former may be made close, giving a result practically just as good as if the osseous continuity of the neck had been re-established.

The difficulty of determining oftentimes whether or not the fracture is entirely within the capsule is recognized, as also the uselessness of such determination; and due recognition is made of the fact that at times it is absolutely impossible at first to tell whether or not there is any fracture. As respects the question of the intra- or extra-capsular location of the line of break, it must always be borne in mind that only by actual inspection can it be determined in any given case what is the inferior attachment of the capsule posteriorly; and if this be unknown, as it must of necessity be during the life of the patient, how perfectly absurd is most of the discussion that has been and is still being had upon this subject, and of how

¹ Edin. Med. Journal, April, 1883.

little value has been the presentation of most of the bony specimens from which the ligaments have long been completely removed. Respecting the prevention of shortening after fracture of the shaft, the author, while believing in its possibility and of its occurrence at times, does not believe that "there is any method of treatment which can be depended upon to secure it in any given case, for it can never be known in advance whether or not the patient will be able to support the traction and pressure necessary to success."

The weight and extension method of treatment with Buck's coaptation splints and Volkmann's sliding rest is the one habitually employed by the author; the plaster-of-Paris dressing being regarded with little favour, since it "does not furnish complete permanent extension, because of the absence of an upper fixed point of support." It is advised that the "patients should not be allowed to use the limb, even with crutches, until the seventieth or seventy-fifth day, notwithstanding apparent firmness of the union, and that splints should be kept for the same length of time upon patients whose obedience and reasonableness cannot be counted upon."

Intercondyloid fractures are not believed to be caused by "violence transmitted through the patella, which acts as a wedge, and splits off the condyles," but by a penetration and splitting of the lower by the upper fragment of the primarily produced shaft fracture. Incision or aspiration of joints in recent articular fractures, "to empty them of the effused blood and synovia," is regarded with little favour unless the indication is very positive, but "on the other hand it is proper to incise the joint, wash it out, and drain it at the earliest possible moment after suppuration has begun."

Fractures of the patella, "in the great majority of cases," are believed to be caused by the contraction of the quadriceps, and the separation of the fragments is thought to be due in great part to the retraction of that muscle; "but not entirely so, for from the moment that the joint becomes at all distended by an effusion of either blood or synovia into it, the fragments are pressed apart by the liquid to meet the need of more space." It is certainly often the case that the early muscular action produces very little separation, the lateral fascial attachments being in part at least untorn, and if joint inflammation can be prevented or greatly limited by compression or the application of cold, the fragments will not at any time during the progress of the case be found removed to any considerable distance from each other. A light plaster-of-Paris dressing over the limb, with a large opening over the knee, to the edges of which hooks are fixed for the attachment of rubber bands to press the fragments together, is the apparatus preferred in the treatment of these fractures.

The objections to the Malgaigne hook are stated to "seem to be mainly sentimental, the dislike to penetrating the skin and causing pain." How sentimental those surgeons must be who agree with Agnew in regarding this hook as an "infernal machine!"

Leg-fractures are classified according as they affect the articular ends of the tibia, the shaft of that bone, or the fibula. Attention is specially directed to the exceptionally serious prognosis of tibial fractures when the break is located very high up, and the unusual length of time required for the establishment of firm union. "No satisfactory explanation has been given of this peculiarity." In the treatment of fractures of the shaft preference is indicated for the early use of the fracture-box with cooling

lotions (*e. g.*, the lead and opium wash), and later the plaster-of-Paris immovable dressing; it being thought better "to defer complete eneasement in plaster until after the primary swelling has subsided." Many of such of the readers of this book as have treated a considerable number of these cases will beg leave to differ. Certainly nothing can be more comfortable to the patient and less troublesome to the surgeon, nothing more likely to secure the desired repair *tuto, citoque jucunde* than an early and properly applied "stirrup-dressing," held in place by bands here and there, or, if preferred, by a roller extending from the toes to the middle of the thigh. If the fracture was in his own leg, it is very possible that the author would hardly be willing to lie for ten days on the flat of his back with the limb in a fracture-box waiting for the subsidence of an inflammatory swelling that ten chances to one might have been prevented by an early application of an immovable dressing, a dressing that by no means necessitates complete eneasement of the limb. The paragraphs on "fractures at the lower end of the leg" present clearly and succinctly the chief features of these very common and troublesome injuries. Here again the use of a fracture-box for a week or ten days is advised, and very properly too, "if there is much swelling, ecchymosis, and tenderness, if blebs have formed;" but in a considerable proportion of cases, especially of those seen early, there will be no such symptoms developed if complete reduction of the displacement is made and fixation of the fragments secured by immobilization of the leg and foot. Here, as in other joint-fractures, hours if not minutes are of value, and it is such injuries, perhaps, that have given rise to, certainly give reason for, the popular idea that fractures must be set *at once*. In cases of simple fracture of the astragalus, with displacement of a fragment, immediate removal of the latter is thought fully justified (as also of the rest of the bone if necessary); and in compound fracture the same course is unhesitatingly advised. Such procedure is without doubt the proper one in hospital or city practice, but in more favoured sections of the country where the patient can have the benefit, not only of careful nursing, but of the best hygienic surroundings, both part and life can undoubtedly be frequently saved.

The mechanical execution of the work is what might have been expected, knowing the publishers, and the plates (of which there are three hundred and sixty) are in unusually large number new and well executed. A very few typographical errors, some of them in proper names, have been noticed, but none of any special importance.

Taken all in all "Stimson on Fractures" is an excellent work, well deserving of and repaying careful study, and is a real addition to professional literature.

P. S. C.

ART. XXII.—*Lectures on Orthopedic Surgery and Diseases of the Joints.* By LEWIS A. SAYRE, M.D., Professor of Orthopedic and Clinical Surgery in Bellevue Hospital Medical College, etc. etc. Second edition, revised, and greatly enlarged, with 324 illustrations. 8vo. pp. xx., 569. New York: D. Appleton & Co., 1883.

In the number of this Journal for July, 1876, we expressed the very high opinion we entertained of the value of this book, and it gives us

pleasure to reiterate that opinion now. It is a book of expedients rather than of dry pathological details, although this foundation of treatment is by no means neglected. On turning over its pages there will be found those practical applications of the healing art which are acquired by extended experience, and which prove of inestimable value to the general practitioner.

The work has been very thoroughly revised and the later experience of the author incorporated in it. The haste with which it was originally issued led to many carelessnesses of expression, which in this second edition have been almost entirely removed, to the great literary improvement of the volume. A large number of new illustrations have been added. Conspicuous among these, both by its position as the frontispiece, and the important teaching it conveys, is the lithograph exhibiting the appearances presented after an excision of the head of the femur. The operation was done in September, 1875, upon a child two years and nine months old. The wound healed almost perfectly, but waxy degeneration of the viscera ensued, and the child died in March, 1878. Upon examination it was found "that not only was the bone reproduced very nearly in form and size, as well as length, of the opposite one, but also that true articular cartilage had been newly formed, and the motions of the joint were quite free."

It is in connection with resection of the hip-joint for coxalgia that Dr. Sayre has achieved some of his notable triumphs, and has attracted deserved attention. It has been largely through his boldness, and his enthusiastic advocacy of it, that this operation has been proved to be comparatively free from danger. In a table compiled by his son, Dr. Sayre's experience with this operation in seventy-two cases is presented to the reader. In the former edition but fifty-nine cases were tabulated. Out of the entire number now scheduled, recovery is stated to have followed in sixty-three cases, while nine died from the exhausting effects of hip disease. Forty-seven were alive when this volume was prepared, and a summary analysis of the results makes a very favourable showing. From our own experience with, and observation of this operation, we have learned to regard it as one but rarely fatal, as very generally prolonging life, but as not ordinarily attended with such satisfactory ultimate results as Dr. Sayre has recorded in this volume.

Since the publication of the first edition of these lectures, the method of treating spinal curvatures by extension, and a fixed jacket, then a novel procedure, has been largely developed by Dr. Sayre, and brought fully before the profession by other publications and repeated demonstrations. The favourable opinion of the method we expressed when we first reviewed this book, has been abundantly borne out by the experience of the profession since. The trial which we then proposed to give the proceeding has been repeatedly made since, and always with satisfaction. The principle underlying the treatment originated by Dr. Sayre is the correct one, and the profession and very many of the laity are indebted to him to a degree which can hardly be exaggerated. Some surgeons prefer to use other material for the construction of the jacket, merely using it to obtain an accurate cast of the extended body, upon which a leather, poro-plastic, or other jacket can be fitted, but the principle is the one with which the profession has become acquainted through the enthusiastic efforts of Dr. Sayre. For ourselves we have been abundantly satisfied with the plaster jacket. Objection has been made that it is dirty, but we have found that

with reasonable care tolerable cleanliness can be preserved. Then the application is so easy, and the material so cheap, that the renewal of the plaster corset provides a ready remedy. We have known one to remain on for six months, and though this is an extreme length of time and certainly greater than is desirable, it goes to show that when properly applied, and properly attended to afterwards, it provides as nearly permanent a form of dressing as we can well hope to obtain. Especially is this the case in growing children. Of course some other substance may be found to answer, and as we have said, there are several such in constant use which give satisfaction; but inasmuch as the plaster roller can be applied by any careful physician, without recourse to the aid of instrument-makers, and gives good results, extending over a considerable course of time at a very moderate cost, we are of the opinion that the plaster jacket is entitled to a long lease of life. Yet in this day of invention it is quite possible some other, cleaner, and equally reliable substance may be found to be a desirable substitute for it, but we feel quite sure that the principles of treatment will remain unchanged.

The method of applying extension to the cervical portion of the spinal column, by what Dr. Sayre calls his jury-mast, we have also repeatedly tested, and with marked advantage in suitable cases.

Dr. Sayre is careful to point out that while he uses a plaster corset in lateral curvature of the spine, it is only as an adjuvant to careful gymnastic exercise of the muscles. He only allows it to be worn during the daytime, as a comfort and aid to the weakened muscles. As the aid of the instrument-maker is required to complete this corset, the leather jacket seems to us to possess advantages in this class of cases.

The book has been considerably enlarged, the number of lectures having grown from twenty-nine to thirty-one, and, as before said, many new illustrations have been added. The index is also enlarged and improved. Indeed, the whole volume is an advance upon the first edition, both in style and material. It brings the subjects treated of in it up to the present time, and gives its author's latest and matured views. Records of personal experience, when honestly and fairly told, are always valuable, and as such this book is an important one. Of course Dr. Sayre is well known to be an enthusiastic man, and many will refuse to see things exactly as they appear to him, but it is the enthusiast who impresses those with whom he comes in contact, and to Dr. Sayre's enthusiasm the profession owes much.

Few books have the personality of their authors more forcibly impressed upon them than this one. This fact gives piquancy and interest to the volume, and the reader of it will rise from its perusal with the impression that its author has written of that he has had experience in, and that the extent of Dr. Sayre's experience gives weight to his opinions. Although not yet the complete treatise we have expected to see from the pen of the Bellevue Professor, and which we yet hope to see produced by him, the present volume is a step in that direction. Meantime every surgeon who has to do with the subjects of which it treats will do wisely to have this volume within easy reach upon his shelves.

S. A.

ART. XXIII.—*A Manual of Practical Hygiene*. By EDMUND A. PARKES, M.D., F.R.S., late Professor of Military Hygiene in the Army Medical School, Member of the General Council of Medical Education, Fellow of the Senate of the University of London, Emeritus Professor of Clinical Medicine in University College, London. Edited by F. S. B. FRANÇOIS DE CHAUMONT, M.D., F.R.S., Fellow of the Royal College of Surgeons of Edinburgh, Fellow and Chairman of Council of the Sanitary Institute of Great Britain, Professor of Military Hygiene in the Army Medical School. Sixth edition. 8vo. pp. xix. 731. Philadelphia, Pa.: P. Blakiston, Son & Co., 1883.

WE looked for the new edition of Parkes's *Hygiene* with an interest which was probably shared by a majority of the profession in this country as in England. Sanitary science is popular, and the general practitioner must keep himself well informed as to its precepts. His position as adviser necessitates a thorough knowledge of the more important sanitary questions, and an occasional reference to some standard volume for light on points which may be obscure or ill-defined. There are few of us, therefore, without some work on hygiene on the book-shelf, and that work is usually Dr. Parkes's *Manual*, which appeared about twenty years ago as a text-book for the young military surgeon. Although prepared for a special class of readers, it filled a vacant space in the medical literature of the English speaking people; and medical men in civil life studied it for its principles and applied its teachings. In the fourth edition, published in 1873, its scope was enlarged, and it was put in better form for its civilian readers; the discussion of questions of a chiefly military character being transferred in this revision to a second part. A fifth edition appeared in 1878, but in the mean time the author, who had given such an impetus to practical sanitary work, died, and the issue was made by Dr. De Chaumont, his successor in the chair of Military Hygiene in the Army Medical School.

The sixth edition, now before us, is also edited by Dr. De Chaumont, who, in a short preface, indicates the character of his work, by stating that he has omitted matter which had either become out of date or was no longer necessary, by which space has been obtained, without material increase of the volume, for matter which the progress of science and the results of experience rendered it advisable to add. "Some slight changes have been made, such as putting all the directions for making chemical solutions in one appendix at the end, and uniting all the questions of disinfection and deodorization in one chapter." We take no exception to these changes; but there is a change unmentioned in the preface which we think Dr. De Chaumont ought not to have made. The personality of Dr. Parkes has been thoroughly eradicated from the volume. The personal pronoun which he occasionally used in the text, and more frequently in the foot-notes, and which placed one so much in sympathy with the author, is eliminated, and either the editorial plural takes its place, or the sentence is remodelled to exclude the pronoun; in the foot-notes, however, the first person singular remains of frequent occurrence, but it is the editor, not Dr. Parkes, who speaks. Few will consider that Dr. De Chaumont's labours have so appreciated the text as to warrant this liberty with the personality of his author.

Many of the notes of former editions have disappeared by embodiment

in the text. The omissions are few. Two only are noteworthy, and we regret them both. Dr. Parkes, in speaking of the exhausting effects of heat, calls attention to the fact that there is then really lessened quantity of oxygen in a given cubic space; and to give a definite value to this diminution, he added in a note a calculation to show that in the 16.6 cubic feet of air that a man draws into his lungs in an hour, there would be, at 80° Fahr., 192.6 grains of oxygen less than if the air breathed was at 32° Fahr. The experience of the teacher dictated this note, which is omitted in the present edition. The other involves the tables of watery vapour in air at different temperatures and the relative humidity from wet and dry bulb observations. The new volume refers us to Glaisher's tables, but the sections of these tables originally printed by Dr. Parkes, were sufficient for the needs of the sanitary student, and rendered such a reference unnecessary.

On opening the volume for perusal, we found on pages 2 and 3 references to Buck's *Hygiene* which were flattering to our national esteem, inasmuch as from this early appearance of American work in the new edition we anticipated many future acknowledgments of the ability and perseverance of our sanitary men. We were disappointed in finding that the observed references related only to a statement of the water supply per head in American cities. But our disappointment was greater on discovering that, although Buck's *Hygiene* was in the hands of our editor, he finished his revision without having again occasion to refer to its pages.

Dr. De Chaumont has paid much personal attention to the work of the water analyst, and, as might be expected, there are some additions to and changes in the text on this subject. Indeed, more labour has apparently been expended on the revision of the long chapter on water than on any other part of the volume, yet those who have studied this subject will be disappointed with the result. The "*influences*," as the careless proof-reader has it, deducible from the quantitative tests are stated at greater length than in the old edition, but their character remains unaltered. No notice is taken of Dr. Cory's experiments on intentionally polluted waters, published in the Supplement to the Eleventh Annual Report of the Local Government Board, nor of the similar but more extended investigation carried on by Professor Mallet, of the University of Virginia, an abstracted report of which appeared as a Supplement to the Bulletin of our National Board of Health. Hence no discussion of the results, as influencing the "*inferences*" is presented. The possible presence of bacteria of a specially poisonous character in water is admitted, and a reference is made to the fermentative nature of the nitrification process; but the sentences are meagre and unsatisfying.

Indeed, the changes in this edition are so few that we feel at liberty to note them *seriatim* for the benefit of those who have not the volume at hand. In speaking of the relative sanitary advantages of the intermittent and constant systems of water supply a distinct preference is given to the latter, although no new facts are introduced as the basis of the preference. A paragraph appears showing, on the authority of Mr. G. Deacon, that the loss on the constant system occurs from leaks in pipes and drawn joints before the water reaches the consumer. It is considered inadvisable to use charcoal for filtration on the large scale, chiefly because low forms of animal life are prone to develop in the water. Spongy iron does not so affect the water, and, as it retains its filtering power for "a very much longer time" than animal charcoal, it should be used in preference, al-

though filtration through it takes place more slowly than through charcoal. Carfural, the composition of which has not been made known, but which is understood to consist of *carbon*, *ferrum*, and *alumina*, is considered better than charcoal, but less valuable than the spongy iron. In speaking of malarious waters a paragraph is given to experiments by Dr. Smart, U. S. Army, published in this Journal, January, 1878, showing the coincidence between malarial fevers and impurity, derived from rain falls and snow meltings, in the water supply. The malarial poison is blown up with vegetable organic matter from the plains, precipitated with the rain or snow, and, when the latter melts, is carried into the streams. Should the views of Klebs and Tomassi-Crudeli be confirmed, the existence of malaria in water must be looked upon as still more probable. The well-known Caterham epidemic is added to the list of cases of typhoid propagation by the water supply, but no notice is taken of the singular case at Lausen, although the latter demonstrated the passage of the fever poison through a natural soil-filter which removed the minute granules of wheat starch. The probability of the transmission of the poisons of scarlet fever and diphtheria by water carriage, either directly or by their being mixed with milk, is allowed. Some additions are made to the instructions given concerning the collection of water for analysis. Chlorine is determined, as in the older editions, by silver solution and potassium chromate. The difficulty of obtaining exact results by this process in the presence of much organic matter is not recognized, nor is there a notice of Sal-kowski's method of determining the chlorine. De Chaumont's own process for the estimation of nitrous acid, by the use of permanganate before and after the destruction of the acid, gives place in the new edition to Greiss's process with metaphenylenediamine, which is said to be now accepted as the most accurate method. Our editor does not appear to have heard of the use of naphthylamine hydrochlorate and sulphonylic acid, which possess the advantages of being even more delicate and of giving a coloration which is not liable to be simulated by organic or other matters in the water.

In the chapters on air, the first addition encountered is a paragraph giving the results of Fodor's experiments on the carbon dioxide, which extends the limits of that gas, in what may be considered as normal air, to 6 vols. in 10,000. In the section treating of the living substances in air, to which diseases are attributed, two short paragraphs have been introduced, by which we learn that Pettenkofer, Von Nügli, Fodor, and others distinctly attribute specific diseases to bacilli of certain kinds, that the connection of wool-sorters' disease with a bacillus probably inhaled from the atmosphere has been established, and that Koch has recently demonstrated the existence of a bacillus in phthisis, and has apparently succeeded in cultivating it and propagating the disease by that means. In view of these investigations, and those of Klebs and Pasteur, the sentence on page 511 of the fifth edition, "yet it is certain that, in some of the epidemic diseases, there are no bacteria," has been altered to: "yet in some of the epidemic diseases no bacteria have been as yet demonstrated."

In treating of the connection between sewer air and typhoid fever a new paragraph appears, inviting attention to the German opinion that sewer air can have no causative influence, because it is rare that such air gets into houses, with references to the papers of Soyka, Renke, A. de Rosahegyi, and Lissaner. There are some alterations in the section treat-

ing of the amount of air required, and it is proposed for agreement that the quantity needful for adult males in repose be accepted as 100 cubic metres per hour, or about 1 cubic foot per second. Märker's experiments on the amount for animals are referred to and figures are given, but the whole may be summarized in the closing sentence, that cattle "ought to be practically in the open air." In the article on ventilation a new section appears, discussing losses by friction. This informs us that the loss by this cause in tubes of equal diameter is directly as the length, and in those of equal length it is inversely as the diameters; that each right angle diminishes the current by one-half, and that circular tubes are best because they include the greatest space within their periphery. The only other change in the chapters on air is the condemnation of cowls, as having been shown by the labours of the Sanitary Institute of Great Britain, to have no superiority over the open tube.

The chapters on food are unaltered except by the statements that ground date-stones have been mixed with coffee, and glycerin met with as an adulterant of milk, and by the introduction of a few lines on the alteration of the specific gravity of the latter article by watering and creaming.

But for a paragraph suggesting the importance of the microscopic examination of soils, in view of recent observations on bacteria and nitrification, the chapter on soils is unchanged.

In the discussion of the efficiency of traps, forming part of the chapter on the removal of excreta, we find the results of the experiments of Messrs. Philbrick and Bowditch embodied in the text, showing the danger of "unsiphoning, which small pipes are exposed to." "The experiments also showed how unsiphoning might take place from the pressure descending water from upper floors, so that air might be forcibly driven into the house when upper closets or sinks were used." Dr. De Chaumont does not appear to have understood this American paper, or has failed to express himself with the clearness which we require in a text-book. Traps in small pipes are liable not to unsiphoning, but to the loss of their seals by siphonage. The experiments also showed how the siphoning or unsealing of traps on branch fixtures might be effected by a rush of water through the main soil pipe as from a closet on an upper floor. Water coming from an upper closet will drive the air in the soil pipe before it, producing condensation by a piston-like action, and, if there is no foot ventilation or fresh inlet to the soil pipe, the condensed air may force the traps in branch fixtures, thus permitting a puff of soil-pipe air to enter the rooms. But when the water in the soil pipe has passed, the air behind it has a diminished tension, and the pressure of the external air on the seals of branch traps may force the trap waters over the upper bend of the pipes, and lead to their discharge by siphon action.

The charcoal trays, described in the old edition as used in the man-holes and ventilators of sewers, are disposed of in one sentence in the new volume: "The use of charcoal trays has not answered the expectations that were formed of them." Two other short sentences comprise all the new matter on sewerage. They relate to Shone's ejector system. "This is an opposite plan to Liernur's, the agent being compressed air instead of exhaustion. It has been applied at Wrexham and at Eastbourne, and is well spoken of." No alteration has been made in the article on the separate system of sewerage, although we have had an extensive experiment in Memphis, Tenn., which seems worthy of note in a book of this

kind. In the examination of house pipes and traps we find no mention of the popular peppermint test; nor is anything said of the fresh-air inlet for the through ventilation of the house pipe, which has been so much discussed recently by sanitary engineers.

On the section on the barometer a rule is given, as by Mr. R. Strahan, for the approximative determination of heights:—

“Read the aneroid to the nearest hundredth of an inch; subtract the upper reading from the lower, leaving out or neglecting the decimal point; multiply the difference by 9; the product is the elevation in feet. If the barometer at the upper station is below 26 inches, or the temperature above 70° Fahr., the multiplier should be 10.”

In Book II., on the service of the soldier, some changes appear, owing to the incorporation of the army statistics of the past few years. The short article on Cyprus, occupied in 1878, is new. Some changes are also noted in the clothing of the soldier, the chief of which is the abolition of the old leather stock.

In connection with the “*influences*” noticed above, it may be stated that, on page 196, the misquotation of the old edition is permitted to stand. Speaking of inorganic substances, Dr. Pavy said that they “are hardly of sufficient importance, in an alimentary point of view, to call for their consideration under a distinct head.” The sense is not improved by the careless substitution of *so-called* for *to call*. A text-book should be free from blemishes of this kind.

C. S.

ART. XXIV.—*Health Reports.*

1. *First Annual Report of the Provincial Board of Health of Ontario, being for the year 1882.* Toronto, 1883, pp. 223.
2. *Fifth Annual Report of the Connecticut State Board of Health for 1882, with Registration Report for 1881.* Hartford, 1883, pp. 445.
3. *Sixth Annual Report of the State Board of Health of New Jersey, 1882.* Woodbury, N. J., pp. 361.
4. *Tenth Annual Report of the Secretary of the State Board of Health of Michigan, for 1882.* Lansing, 1883, pp. 630.

1. THE report from *Ontario* to be first welcomed as another encouraging proof of awakening public opinion in regard to its *most important* interest, the care of public health, opens with an account of the organization of the board and a general history of its work, which for that of a year old baby is creditable in the highest degree.

The establishing act provides that the “Provincial Board of Health of Ontario” shall consist of not more than seven members (appointed by the Lieutenant-Governor in council), at least four of whom shall be duly registered medical practitioners. These members serve without pay, except the chairman, who receives \$400, and the secretary, who receives \$1000, but their travelling and other necessary expenses are allowed.

Efforts were very wisely made to utilize the experience of other similar organizations to the best advantage, by sending representatives to attend various sanitary conferences, such as the International Congress of Hy-

giene, at Geneva, in Switzerland, and the Convention at Greenville, Michigan, held under the auspices of the energetic Michigan Board of Health; also to study the methods of work found most practicable by the Health Boards of Massachusetts, New York, Detroit, Toledo, etc., and the information thus gained appears to have been judiciously adapted to the needs of Canadian climate and modes of life. Obviously the duties of a board of health for some time after it is first originated, are chiefly to disseminate hygienic knowledge, and to accumulate statistical information, etc., rather than to attempt original researches into the causes of disease, which will contribute to the common stock of knowledge possessed by the sanitarians of the world. Accordingly we find that an important part of the work of this Board during the first year of its existence has been the distribution of well-written pamphlets on the means of checking the spread of contagious diseases, or resuscitation of the apparently drowned and kindred subjects. Reports of commissions to investigate endemics of typhoid fever and malaria in various parts of the province possess an eminent local value, as do those in regard to an immigrant inspection service, respecting the records of diseases, and the specimen of the "Weekly Health Bulletin" with accompanying explanations.

About thirty pages in the latter part of the volume are occupied with an account of a sanitary convention held at St. Thomas, in imitation of those so successfully organized in various parts of Michigan. At this conference several "local gentlemen" read papers upon such timely topics as the advantages of sanitary education, the adulteration of foods, the ventilation of school-rooms, etc.

Finally, we are favoured with a synopsis of two popular lectures on sanitary subjects, delivered by Dr. P. H. Bryce, Secretary of the Board, in the autumn of 1882. The first of these discourses is "Upon Typhoid and some other Zymotic Diseases, and their Causes and Prevention; the second on "School Sanitation; its Necessity and Methods." Without containing any thing *new* of great moment, these lectures are filled with *old* and well-tried truths set forth in as clear or even eloquent manner, and indicate that their author is an accomplished sanitarian, who has kept pace with the hygienic literature of the day, thus qualifying himself for the responsible position he has been called upon to fill.

2. The Connecticut State Board of Health Report comes to us in an enlarged and improved form, affording another evidence of the advancing appreciation of the claims of public hygiene upon popular attention. The able secretary of the board devotes several pages to a congratulatory review of the proofs of encouraging progress in this direction, among which he justly classes the important action of the Illinois and West Virginia State Boards of Health, in controlling medical practice, and elevating the standard of medical education, which he duly praises as "a work of inestimable value."

Dr. Chamberlin informs us that although smallpox occurred in a number of places in the State during the year, there has been no general or even partial epidemic, an immunity which he attributes partly to the supposed inactivity of the contagion before the fifth day of the eruption, but more especially to the good management of the cases when they first appeared, and the prompt employment of vaccination. The subject of alternate epidemic waves of malaria and typhoid poison is discussed at some length, and whilst admitting that our facts as yet are too few for any complete generalization upon this obscure question, Dr. Chamberlin contends

that observations in New England show that there is no complete law of exclusion in the two types of disease. Scarletina is stated to have been more than usually prevalent, especially during the winter of 1881-2, and precautions against its continuance, in view of the probability that its peculiar poison may reproduce itself outside of the human body, and especially in the bloody washings of slaughter-houses, are very judiciously insisted upon.

Among the important papers on special subjects may be mentioned that of Dr. L. Dennis on "Hetting as affecting the Health of Operatives," which is reprinted from the Third Report of the New Jersey State Board of Health, because the occupation is extensively carried on in Connecticut, and many of the facts upon which the essay is based were derived from observations made in that State. It calls attention especially to the dangers to hat makers of mercurial poisoning, which occurred in 168 out of 1546 operatives in hat factories, 107 of these sufferers being found among the 438 "black finishers." Prof. William H. Brewer contributes a syllabus of his well-arranged lectures on Sanitary Science, in the Sheffield Scientific School, which it is suggested might serve to outline a course of instruction in hygiene that would replace with great advantage some of the less practical branches, so elaborately taught in colleges and the higher class of schools. An interesting article on "Epidemic Intermittent Fever and its Annual Progress in Connecticut and other parts of New England," furnished by G. H. Wilson, M.D., of Meriden, is illustrated by an extensive map; and besides attending to his arduous duties, the industrious secretary, Dr. Chamberlin, has contrived to find time for preparing valuable papers on "Milk as a Medium for the Transmission of Disease," "On Impure Ice," and "On some of the Organic Impurities found in Drinking Water," the last of these being illustrated by several wood-cuts and two photo-lithographic plates. Another important illustrated article is that of Noah Cressy, M.D., V.S., on "Protective Inoculation," in which are reviewed the wonderful results of Pasteur's late experiments upon the "attenuation" of the splenic fever virus, and the brilliant light they throw upon the relations of vaccina to variola, as well as the emphasis they give to the necessity of the strictest sanitary precautions, such as disinfection and isolation, which is clearly pointed out.

The volume concludes with the Registration Report for 1881, the tables of which, with their explanatory text, occupy 128 pages.

3. The *New Jersey Report* opens with that of the eminent Secretary, Dr. Ezra M. Hunt, of Trenton, in which he likewise expresses the conviction that the popular mind is more fully than ever before taking the higher and well-sustained view that health administration on the part of the State is no longer to be looked upon only as a charity, and that "race vitality, physical vigour, and the avoidance of the ascertained causes and concomitants of disease are essential to the welfare of the people and to the prosperity of the body politic." Dr. Hunt informs us that the births during the year were 23,108, whilst the deaths numbered 25,942, an excess of more than 12 per cent., some of this excessive mortality being, he considers, due to the exceptional winters and summers of the years 1879-81. Local outbursts of diphtheria occurred in several places. Measles was largely epidemic in the State, but not in a fatal form. A somewhat diffused prevalence of scarlatina existed, and smallpox appeared in many localities, whence it would doubtless have become generally epidemic had it not been for the efficiency of local health boards, supported

by more intelligent popular views in regard to early isolation and vaccination. A praiseworthy attempt at securing that great desideratum, a pure water supply, has been made by the appointment of a State commission upon this subject, and the able secretary's sound and pertinent remarks upon drainage, sewers, offensive trades, contagious diseases of animals, vaccination, etc., are well calculated to perform valuable service in preserving the health of his fellow citizens.

An essay on the "Disposal of Sewage in Cities," by Julius W. Adams, C. E., professes to be only a review of the several systems which have been proposed, and especially urges that, 1st. Fresh-water streams can undoubtedly destroy organic impurities which are mixed with them. 2d. The depurative capacity of any particular streams depends on the degree of dilution of the foul matters, the amount of disturbance of the current, season, climate, presence of aquatic plants, and the time of exposure of the sewage to these agencies. 3d. That although far more extended investigations are necessary, the few facts already in our possession enable us to partly calculate the expediency of using any particular water-course as a receptacle for sewage.

A short paper on the "Regulation of Moisture in Rooms," by Prof. C. F. Brackett, gives some obscure hints upon this rather abstruse subject, and the secretary's report of "Local Sanitary Inspections of Sea-side Resorts," etc., afford important data for the consideration of seekers after health and pleasure at the various watering places on the Atlantic coast of New Jersey. One of the most valuable articles in the volume and one which represents a vast amount of diligent investigation, is that of Prof. Albert R. Leeds, upon "Health Foods, Invalid Foods, and Infant Foods." We regret that want of space prevents us from noticing more than our author's conclusions upon this important subject, these being, that of the first class, the farinaceous foods, since by no process of cooking or baking at present known can the larger part of the amylaceous matter be converted into sugar or dextrine, none are well adapted for the nourishment of young infants. The Liebig foods, which form the second class, are deficient in carbohydrates, whilst the third class, the milk foods, also exhibit too great a proportion of saccharine matters to the albuminoids, so that "whilst the market supplies us many more or less excellent infant foods, one not open to these objections, and entirely satisfactory, has yet to be made." A brief report of Dr. William K. Newton, Milk Inspector, a reprint of the admirable circulars and laws issued by the Board during 1882, and the report of the Bureau of Vital Statistics, conclude this important addition to the series emanating from the New Jersey State Board of Health.

4. The *Michigan* Report is as usual a rich treasury of hygienic information evidencing anew the eminent ability of its author. Indeed, the whole organization and management of the Michigan Board of Health render it a model in this respect to every State in our Union, and enable it to produce annually an amount of timely, energetic, and efficient sanitary work, whereof each member, and especially the indefatigable secretary, Dr. Henry B. Baker, may well be proud.

We learn from the secretary's report on the communicable diseases, that in the year ending September 30, 1882, diphtheria was the malady of this class most to be dreaded in Michigan, but that it seems plain that this fatal disease can be quickly suppressed if met by prompt and intelligent action of the health authorities properly sustained by the coöperation

of intelligent citizens. Scarlet fever was not nearly so prevalent as it was in the early part of the last decade, and in 22 out of the 82 localities in which it was stated to have appeared, the authorities succeeded in restricting it to a single case. More than 100 outbreaks of smallpox occurred in some 61 localities, with a total of over 600 cases and about 175 deaths. In 16 different places the vigilant care of health officers prevented any spread of the disease, and of the 25 different outbreaks in Detroit almost every one was confined to the first case.

Of the fifty-seven papers, addresses, and reports comprised in the body of the work, eighteen were presented at the Sanitary Convention at Ann Arbor, February 28 and March 1, 1882; twenty-two to the Convention at Greenville, April 11-12, 1882; and the remainder were chiefly furnished by members and from the office of the board. Among the more important of these documents we notice the Introductory Address at the Ann Arbor Convention by President Hon. LeRoy Parker, in which the speaker took issue with Herbert Spencer in regard to his denunciation of sanitary laws, and claimed that the State could well afford to spend ten times what it now does for public service, if half the present annual loss from preventable disease were saved thereby. Dr. O. W. Wight, Health Officer of Detroit, gives a thoughtful and well-written paper on "How to Combat Smallpox," and Prof. Henry F. Lyster, M.D., urgently advocates a system of tents in his brief essay, entitled "The Ambulance Hospital for Smallpox." In a short paper on "The Purification of Water by Freezing," Dr. C. P. Pengra, of Ovid, gives an interesting account of a few experiments which tend to show that water may part with from twenty to fifty per cent. of its contaminations during the process of congelation. Rev. Dr. George Duffield, of Lansing, in a sanitary sermon on "Hygiene and the Clerical Profession," gives an eloquent account of his own experience in avoiding some common and everywhere imminent dangers to health, and sets a bright example to his brother clergymen, which we hope will induce many of them to enlist with physicians in their warfare against preventable death. In his paper on "Food Adulterations," Dr. A. B. Prescott, of Ann Arbor, makes a strong plea in favour of purer articles of diet, calling attention to the stupendous frauds now being practised upon the American people by the manufacturers of glucose and oleomargarine. Glucose, he tells us, could be sold at the factories at from 1½ to 2 cents per pound, and is really sold for 3 or 4 cents. In the retail market it brings as good prices as cane sugars; but of the 300 millions of tons bought by consumers annually in this country none is vended under its true name, so far as could be ascertained. Dr. Wm. Oldwright, of the Toronto School of Medicine, and one of the visiting committee from the Ontario Board of Health, in his address on the "Exclusion of Sewer Gas from Houses," made some pertinent remarks upon this subject, which is now attracting so much attention from sanitarians everywhere, and pointed out the importance of ventilating all traps. Dr. J. H. Kellogg, of Battle Creek, contributes an excellent paper on "Decomposing Animal Matter," illustrated by several wood-cuts, and well calculated to do good service in awakening public attention to the dangers of neglecting that cleanliness which we have the highest authority for believing is akin to godliness, besides being the surest preventive of disease.

Altogether this volume is of a high order of merit, and one which needs no recommendation from us to render it sought for as a valuable acquisition to the library of every student of sanitary science. J. G. R.

ART. XXV.—*The Dispensatory of the United States of America.* By Dr. GEO. B. WOOD and Dr. FRANKLIN BACHIE. *Fifteenth Edition. Rearranged, thoroughly Revised, and largely Rewritten. With Illustrations.* By H. C. WOOD, M.D., Member of the National Academy of Science, Professor of Materia Medica and Therapeutics, and of Diseases of the Nervous System, in the University of Pennsylvania; JOSEPH P. REMINGTON, Ph.G., Professor of the Theory and Practice of Pharmacy in the Philadelphia College of Pharmacy, First Vice-Chairman of the Committee of Revision and Publication of the Pharmacopœia of the United States of America; and SAMUEL P. SADTLER, Ph.D., F.C.S., Professor of Chemistry in the Philadelphia College of Pharmacy, and of General and Organic Chemistry in the University of Pennsylvania. Octavo, pp. 1928. Philadelphia: J. B. Lippincott & Co., 1883.

IN its very remarkable career the Dispensatory of the United States has been associated with that of the Pharmacopœia during a half century. The Pharmacopœia of the United States first appeared December, 1820, and the first decennial revision of it in April, 1831. In spite of the earnest desire of the physicians who participated in its formation and revision to establish it, the work was not then generally accepted as the national authority in the premises either by physicians or apothecaries. The London Dispensatory by Anthony Todd Thomson, M.D.; The Edinburgh New Dispensatory by Andrew Duncan, M.D., and The American Dispensatory by John Redman Cox, M.D., were prominent competitors with others for the confidence of the medical public. Each had followers: The effort to secure uniformity of composition and of strength of official preparations throughout the country through the creation of a Pharmacopœia of the United States, to be the common and only authority was then not yet successful. Though the committees to which the publication was confided were careful to secure the sale of the volume at a minimum cost, in order that it might be within easy reach of all for whom it was designed to be the guide, the book was not as largely purchased as its friends desired. The authors did not expect to be paid for their labour. A copyright was held, not for profit, but for the sake of having control of the text and preserving its authoritative quality and form. The object was to have the authority of the Pharmacopœia everywhere recognized and faithfully observed, and whether this should be attained by the use of the book itself, or from reprints of parts or of the whole of it, did not concern its authors or compilers. They felt no interest in the publisher's account of sales. Their main object was recognition of it as the working standard of all apothecaries in the land. There was no legal power to enforce its observance. Only the force of public opinion could bring it into use. They designed that the benefits of their enterprise should enure to no privileged or known class, but be free and common to all. Their work has all the characteristics of purely public charity, bringing no emolument to the workmen, and leaving its benefit open to the indefinite public.

The authors of the Dispensatory had actively assisted in the first decennial revision of the Pharmacopœia, 1830, and were familiar with the aim and policy of those who participated in its creation. In Europe the National Pharmacopœias are prepared under governmental authority, and

their observance is thus prescribed, but in the United States, where the government is in no sense represented in the work, only favourable public opinion can create that influence which serves in the place of authority to secure respect for the Pharmacopœia and bring it into general use.

The Dispensatory of the United States—by George B. Wood, M.D., and Franklin Bache, M.D.—was published January, 1833, fifty years ago. They adopted the Pharmacopœia of the United States as the basis of their work.

“It is followed both in its general division of medicine, and in its alphabetical arrangement of them in each division. Precedence is, in every instance, given to the names which it recognizes, while the explanations by which it fixes the significance of these names are inserted in immediate connection with the titles to which they severally belong. Every article which it designates is more or less described; and all its processes, after being literally copied, are commented on and explained wherever comment and explanation appeared necessary. Nothing in fine has been omitted which, in the estimation of the authors, could serve to illustrate its meaning, or promote the ends which it was intended to subserve. This course of proceeding appeared to be due to the national character of the Pharmacopœia, and to the important object of establishing, as far as possible throughout the United States, uniformity both in the nomenclature and preparation of medicines.

“The nomenclature adopted by the different British Colleges, and their formulas for the preparation of medicines, have been so extensively followed throughout the United States, that a work intended to represent the present state of pharmacy in this country would be imperfect without them; and the fact that the writings of British physicians and surgeons, in which their own official terms and preparations are exclusively employed and referred to, have an extensive circulation among us, renders some commentary necessary in order to prevent serious mistakes. The Pharmacopœias of London, Edinburgh, and Dublin have, therefore, been incorporated, in all their essential parts, into the present work. Their official titles are uniformly given, always in subordination to those of the United States Pharmacopœia, when they express the same object; but in chief, when, as often happens, no corresponding medicine or preparation is recognized by our national standard. In the latter case, if different names are applied by different British Colleges to the same object, that one is generally preferred which is most in accordance with our own system of nomenclature, and the others are given as synonyms. The medicines directed by the British Colleges are all described and their processes either copied at length, or so far explained as to be intelligible in all essential particulars.

“Besides the medicinal substances recognized as official by the Pharmacopœias alluded to, some others have been described, which, either from the lingering remains of former reputation, from recent reports in their favour, or from their important relation to medicines in general use, appear to have claims upon the attention of the physician and apothecary. Opportunity has, moreover, been taken to introduce incidentally brief accounts of substances used in other countries or in former times, and occasionally noticed in medical books: and that the reader may be able to refer to them when desirous of information, their names have been placed with those of the standard remedies in the index.”

The preceding paragraphs, taken from the preface of the first edition of the Dispensatory, January, 1833, describe concisely and accurately the character of the work when first presented to the public. It was in fact the American expositor of the Pharmacopœia of the United States, as well as of the several Pharmacopœias of Great Britain then existing, but since merged into the British.

Fortunately for the success of the Pharmacopœia, the authors of the Dispensatory were eminently well qualified in every sense to execute the task they had assumed. The merits of their book were immediately re-

cognized and secured for it a ready sale. Their excellent commentary on the work enhanced the importance of the then young Pharmacopœia of the United States in the estimation of the medical public, and contributed much towards establishing it as the national standard. In fact, every copy of the Dispensatory sold placed a copy of the Pharmacopœia also in the hands of the purchaser, and thus the benevolent purpose of the authors of the latter was assisted. There was no rivalry between the two works. The mission of the Pharmacopœia, so to speak, was fulfilled in the publication of the Dispensatory, which it had engendered. While it was extensively used, no one cared to urge the sale of the Pharmacopœia. But about the year 1870, some earnest but imperfectly informed thinkers began to inculcate a fallacious notion that the success of the Pharmacopœia could be measured only by its sale; and as not more than one copy of it was sold to a thousand copies of the Dispensatory, it was plain that the publisher did not push the two works with the same interest or energy; and, possibly, in other hands the Pharmacopœia might be made to yield a handsome profit to the compilers, especially if the Dispensatory could be prevented from using or commenting on it. Yet, it is confidently believed, that without the assistance which it gave, the Pharmacopœia alone would have failed in its sole purpose of securing its own recognition as the common standard of the country for all official preparations.

The welcome reception of the Dispensatory, and its progress in public favour, were manifest in the necessity of a second edition, November, 1833, within ten months after the publication of the first. A third edition appeared, June, 1836, and a fourth in June, 1839, each having been carefully revised and enlarged. Every subsequent edition fairly represented at the time of publication the progress which materia medica and pharmacy had made, always opportunely including the decennial changes in the Pharmacopœia.

Seemingly, the immense influence of the Dispensatory in establishing the Pharmacopœia, and its close and constant relations with it, have not been considered of late, for we find on the back of the title page that "Authority to use for comment the Pharmacopœia of the United States of America, sixth decennial revision, has been extended by the Committee of Revision and Publication," implying that the copyright of the Pharmacopœia is no longer held for a purely benevolent and scientific purpose, as it always had been.

The fifteenth edition of the United States Dispensatory follows the sixth decennial revision of the Pharmacopœia of the United States, which differs widely from preceding revisions in its general arrangement, and in the method of its formulæ. All the ingredients of each are stated in parts by weight instead of definite quantities, with the exception of formulæ for pills, in which they are stated in grains, and also in grammes. No measure of capacity is used. Whatever may be the advantages claimed for this plan in theory, there are some objections to its practical use which seem plausible at least, and, therefore, entitled to consideration. Dispensing apothecaries, who make their own official preparations, as all should, instead of purchasing them from a manufacturer, object to a formula in parts by weight that it is not convenient, involves unnecessary expenditure of time, because it requires a calculation for every operation, a sort of translation of measures by weight into measures of capacity, and that risk of error attends every such calculation. Formulæ expressed in definite weights and measures are more convenient to read and less liable

to error in compounding. Besides I will continue to prescribe by measure as long as they must the administration of liquids by measures of capacity, wineglass or spoonfuls. It is also objected that at this time the addition to the pill formulæ of the Pharmacopœia, the equivalents of grains in metric weights seems premature, to say the least, and is, therefore, considered a mere surplussage of learned ornamentation, which has no value in the practice of apothecaries generally, for whose use the Pharmacopœia is especially designed, and probably will not have until the metric system of weights and measures alone is taught, to the exclusion of all other weights and measures, in all American schools of medicine and pharmacy, and the conversion of weights from one system into another, which, like the conversion of currencies, is generally considered burthensome, ceases to be necessary. Then all prescriptions will be written according to the metric system, because physicians will be accustomed to no other; but there is nothing now apparent upon which to found a reasonable conjecture that this is likely to be until after the Pharmacopœia has experienced many more decennial revisions—if ever. Another criticism from the apothecaries' view is that the Pharmacopœia is no longer purely American, but has a foreign, continental tone, more in harmony with our German than with our British brothers with whom we are more congenial in our scientific ways and work.

In deference to such objections, the authors of the Dispensatory have given, in addition to parts by weight, their equivalents of the formulæ in definite quantities, according to the established weights and measures. The "official formulæ have been adapted to the use of those pharmacists who prefer the system of measuring liquids. The alternative formulas have been carefully tested in practice." This concession to the views of apothecaries will probably assist to maintain the observance of the Pharmacopœia as the standard of official preparations, though it may possibly lessen its commercial value, which is of little importance comparatively.

The Dispensatory is divided into three parts. The first embraces all the substances and preparations that are official according to the British and United States Pharmacopœias; the second treats of drugs and medicines which are not official, and the third part contains lists of chemical tests, various tables and analyses of mineral spring waters of the United States and foreign countries. A full index, which covers 78 pages, completes the volume.

The results of the labours and experience of the several authors, which have been accumulating during a half century, are presented in the fifteenth edition of their work, which is a full and reliable repertory of all the official materia medica recognized in the United States and British Pharmacopœias, as well as of very numerous matters, which, though not official, are more or less employed in the practice of medicine and surgery. No previous edition of the United States Dispensatory at the date of publication was more worthy of commendation than is the present.

W. S. W. R.

ART. XXVI.—*Medical Essays*; 1842–1882. By OLIVER WENDELL HOLMES. 12mo. pp. x., 445. Houghton, Mifflin & Company, Boston. New York, 1883.

It is permitted to few men to be prominent both in their professional sphere and in the world of letters. Among those few, however, the name of the writer of these essays is conspicuous—and the tenacity with which Dr. Holmes has kept up his connection with the profession of his love, even while receiving the plaudits of a world-wide arena, is shown by his again issuing in collected-form essays which are purely technical.

Any one who takes up this neat and attractive volume and peruses the essay upon homœopathy, or the famous controversial one upon the contagiousness of puerperal fever, will be at once struck with the fact that the purity and vigour of style, the keenness and precision of statement, with the genial wit ever bubbling to the surface, are marks of literary ability pretty sure to seek exercise beyond professional limits.

It is unnecessary for us to comment upon the completeness of fulfilment which has waited upon the promise of those early essays. The name of Dr. Holmes is known wherever the English language is spoken, as one of the brightest and most genial of living writers, and none are more proud of him than his professional brethren.

It is, therefore, fitting that at a time when he is laying down professional duties long and ably filled by him, we should add ours to the general voice of congratulation, and express the hope that the rest so well earned may be long enjoyed.

Most of these essays are of a semi-popular character, rather than direct contributions to medical knowledge, but they deal with subjects upon which every cultivated physician should be informed. The beauty and mellifluousness of their style, as well as the cogency of their facts, make them profitable reading for the spare hours which the most busy practitioner must snatch from his round of occupation, and the hours thus spent will slip speedily and pleasantly by. In the essay upon the contagiousness of puerperal fever, Dr. Holmes enunciates a doctrine which has been very generally received, before the domination of the germ theory so fashionable at the present day, and even those who may have felt disposed to question the arguments of the essay, have very generally conformed their life to the theory. Of those who were opposed to Dr. Holmes, it may be said—

“The knights are dust,
Their swords are rust,
Their souls are with the saints we trust,”

and the unavoidable asperity of a controversial article falls, therefore, somewhat harshly upon the ear, when the mind dwells lovingly upon the memory of those who are gone.

But we have said enough of a volume which will be eagerly read because it is the work of Dr. Holmes—and which, as we have said, will surely give pleasure to every reader.

With Dr. Holmes's resignation of his chair at Harvard, and his publication of these essays, we may regard his professional career as closed. We are happy to know that he is still active in the fields of general literature, and while we congratulate him upon triumphs well won in the past, would express the hope that he may long continue to labour in those fields effectively.

S. A.

ART. XXVII.—*A Text-book of the Diseases of the Ear and Adjacent Organs.* By Dr. ADAM POLITZER, Imperial-Royal Professor of Aural Therapeutics in the University of Vienna, Chief of the Imperial-Royal University Clinic for Diseases of the Ear in the General Hospital, etc. Translated and edited by JAMES PATTERSON CASSELLS, M.D., M.R.C.S. Eng., Aural Surgeon to and Lecturer on Aural Surgery at the Glasgow Hospital and Dispensary for Diseases of the Ear. 8vo. pp. 800. Philadelphia: Henry C. Lea's Son & Co., 1883.

PROF. POLITZER's well-known reputation as one of the first authorities on diseases of the ear will lead the reader to expect something more than an ordinary text-book in a work that bears his name, and he will not be disappointed. As the translator says, it "treats of the whole science of otology in the fullest and most exhaustive manner." Time and labour have not been spared in its preparation; it was issued in German in two volumes, and four years have been consumed in the production of the second. The anatomy, physiology, pathology, therapeutics, and bibliography of the ear are so ably and thoroughly presented that he who has carefully read this imposing volume can feel sure that very little of interest or value in the past or present of aural surgery has escaped him.

A description of the anatomy of the ear and its development occupies the first sixty pages, and is followed by a chapter on the physiology of the sound-conducting apparatus. Then comes the practically most important part of otology, the diseases of the middle ear, the author's classification of which deviates somewhat from that usually employed. He opposes the view of Gruber that the various forms of inflammation of the middle ear are the same process modified by internal and external conditions; as anatomical investigation and clinical experience show that certain inflammations of the tympanum have peculiarities which give them a distinct clinical type and often determine the prognosis and treatment. He thinks that much progress in our pathological knowledge will be necessary before a strictly scientific classification will be possible, and prefers for present use the classification on a clinical basis, assuming that for practical purposes it would be advisable to call those forms which run their course without significant inflammatory phenomena, and with a discharge of sero-mucous exudation, "catarrhs," and those forms which are accompanied by violent inflammatory phenomena, by formation of sero-purulent or simply purulent secretion "inflammation." The inflammatory diseases of the tympanum—the different forms of "otitis media"—are, therefore, classified as *acute inflammation of the middle ear*, *catarrh of the middle ear*, *adhesive catarrh*, *acute purulent inflammation* and *chronic purulent inflammation*. It seems to us questionable whether this is an improvement upon the nomenclature in general use, or is not more likely to lead to confusion than to "define more clearly certain forms of inflammation of the middle ear." A classification admittedly not strictly scientific, had, perhaps, better be as brief and simple as possible, and as little at variance with the generally accepted meaning of the terms that are used. It would be no great loss to medical nomenclature if the terms "catarrh" and "catarrhal," which have been so much abused and distorted from their original meaning, and have reached the height of absurdity in the expression "*dry catarrh*," were dropped from it altogether.

Under the head of "*the adhesive processes of the middle ear*," a section

of "*catarrh*," is discussed that unfortunate condition upon which authors, not being able to do much else for it, have been sufficiently liberal in conferring names, as "*otitis media catarrhalis chronica*," "*otitis media catarrhalis sicca*," "*otitis media sclerotica*," "*proliferous inflammation of the middle ear*," "*otitis media iperplastica*," "*otitis media adhesiva lenticulosa*," etc. If called upon to add one more to the list, we would suggest "*opprobrium of aural surgery*," as, call it what you will, it always makes a very dreary chapter in otology. The affection of the labyrinth which so frequently complicates this form of tympanic disease, the author thinks is not usually of secondary origin. "With such decided labyrinthian symptoms appearing even at the outset of the affection, we are from clinical observation often driven to the assumption that both divisions of the ear, the tympanum and the labyrinth, have been affected at the same time and by the same disorders of nutrition. In the beginning of the disease, however, the labyrinthian disturbances sometimes prevail to such an extent that we must doubt whether in such cases the primary disease did not originate in the labyrinth, and whether the development of the obstacles to the conduction of sound did not occur later." Politzer has no doubt as to the fact that certain patients hear much better in noisy places, a symptom (*paracusis, Willisiana*) which has been the subject of much discussion, and the occurrence of which is denied by some good authorities. He has satisfied himself on this point by experimenting upon a large number of cases, and has met with some in which whispered speech was better heard in riding than loud speech in rest and with quiet surroundings. He has noticed this symptom almost exclusively in incurable forms of middle ear disease. Thirteen or fourteen pages are devoted to the discussion of "the operative treatment of the adhesive processes," but nothing very encouraging is developed. After reading the pros and cons of artificial perforation of the *membrana tympani*, with or without the uniformly fruitless efforts at maintaining a permanent opening; multiple incisions of the membrane; tenotomy of the tensor tympani; section of the posterior fold of the membrane; section of the anterior ligament of the malleus, etc., we find nothing to disturb our melancholy assent to the dictum of Dr. Roosa, that we are still without any operation that can rescue these cases from the category of hopelessly incurable diseases. This statement was made at the meeting of the American Otological Society for 1881, and met with the active concurrence or silent consent of all present.

We are pleased to note that Dr. Politzer considers the "dry treatment" of chronic suppuration of the middle ear, entirely discarding the syringe, which has recently been somewhat ostentatiously paraded, singularly enough as something new under the sun, applicable only to a very limited number of exceptional cases. He also pronounces syringing by far the best means for the removal of cerumen and foreign bodies—a stronghold in which some restlessly advanced aurists have not hesitated to attack it. Though aural therapeutics has long since passed that stage of development in which it could be made the subject of such witticisms as that of the cynical general-surgeon, who, some years ago, proposed to divide diseases of the ear into two great classes—1st, those that can be cured by the syringe, and 2d, those that can't—we still cordially agree with the statement recently made by Dr. Knapp, that in a large proportion of cases of purulent catarrh, thorough cleanliness is half the cure. In obstinate cases of acute suppuration of the middle ear, particularly where the mastoid is involved, Politzer strongly recommends injections of warm water through

the Eustachian tube, by means of the catheter. His favourite local applications are boracic acid, in powder or solution, and, in cases of chronic supuration with granulations of the tympanum, alcohol. In acute inflammation of the mastoid he has obtained good results from the application of cold by means of Leiter's coil of leaden tubes. The indications for operative treatment of caries of the temporal bone and mastoid abscess, and the important subject of otitic meningitis and cerebral abscess are thoroughly discussed.

Othæmatomata are considered to have their origin usually in injury, and their remarkable frequency in imbeciles is admitted, but no mention is made of the insane in this connection.

There is an interesting chapter on the anatomy, physiology, and pathology of the internal ear, which we have not space to more than refer to. The author admits that "the physiological significance of the semi-circular canals has not been made out, notwithstanding numerous experimental investigations on this subject," but sides with the view that disturbances of coördination after injury of the canals proceeds from simultaneous injury of the cerebellum, or reflex transmission of irritation from the ampullary nerves to the cerebellum. He objects to classifying as "Ménière's disease," all disturbances of hearing associated with subjective noises and giddiness, and confines the term to cases of apoplecticiform effusion in the labyrinth, accompanied by the symptoms described by Ménière.

Disturbances of hearing from cerebral causes, which are usually considered very rare, the author thinks are much more frequent than has hitherto been supposed, and the interest in his able discussion of this subject will by no means be limited to aural surgeons.

The thanks of the English-speaking part of the profession are due to Dr. Cassells, for bringing this valuable book within their reach. He has done a good work, and has done it remarkably well. G. C. H.

ART. XXVIII.—*A Practical Treatise on Diseases of the Skin, for the Use of Students and Practitioners.* By JAMES NEVINS HYDE, A.M., M.D., Professor of Skin and Venereal Diseases, Rush Medical College, Chicago; Dermatologist to the Michael Green Hospital, Chicago, etc. 8vo. pp. 572. Philadelphia: Henry C. Lea's Son & Co., 1883.

IN face of all the activity in book-making in dermatology recently displayed, not only here at home, but in France, England, and Germany, resulting in the production of so many valuable treatises, it may well be asked at once, Was there need of another work of this kind? Certainly no one should feel authorized to write it who has not a large experience to call upon, a proper judgment to select the real and valuable in the observations of others, and the method of presenting his subject-matter which marks the successful teacher. These qualifications the author has shown himself to possess abundantly, and he has given the student and practitioner a work admirably adapted to the wants of each. It has been his endeavour, he says, to "set forth only what can be held as the truth, to be frank in the admission of the weakness with which the most skillful physician stands in the presence of many grave and not a few benign disorders, and to cultivate a wholesome doubt of that which has not been

shown to be worthy of trust;" and well has he carried out his purpose, especially in the last respect.

Although the book is dedicated to Professor Kaposi, Hebra's collaborator and successor in the Vienna chair of Dermatology, and may perhaps be called an exponent of the German school, it is no man's book but the author's, and its individuality is very strong. It is of the German school only because, like that, it takes little for granted which rests upon guess-work and theorizing, and not upon simple observation. Therefore the author gives full credit and indorsement to the researches of his colleagues in all parts of the world, and little seems to have escaped his study; but he lacks veneration for the mere doctrines of even the most distinguished of them in a refreshing degree. Accordingly in etiology and theoretical therapeutics the book may seem to some unsatisfactory, as it fails to furnish a cause or several reasons for the existence of each affection, and to recommend for its cure the administration of remedies consistent with them. In place of such matter we have a frank avowal of our present ignorance of the causation of a large part of the diseases of the skin.

The first part of the volume is general in character and treats of anatomy, symptomatology, etiology, diagnosis, prognosis, therapeutics, and classification. The chapter on anatomy is based upon the recent investigations of the most reliable workmen in this field, and is illustrated by well chosen cuts. The descriptions are brief, and occasionally a little vague, as when the author states that "there is strong reason to believe that the odorous emanations from the skin are the sole sources by which several of the contagious and infectious diseases are communicated from one individual to another." In describing the forms of cutaneous efflorescence he prefers to call them lesions and lesion relics, instead of using the terms commonly employed, primary and secondary lesions, although we fail to see the advantage of the innovation. No such words can exactly define the mutual relations of the various forms of eruption in respect to evolution and involution. A useful glossary of ninety of the terms employed to describe the shape, variety, etc., of eruptions is appended to the chapter, which might have been extended with advantage.

The subject of general etiology is treated briefly, for, as above stated, the author has been satisfied with telling his readers only what is known with regard to it. He has no pet theories to maintain, he does not believe in undemonstrable dyscrasies, or recognize the necessary existence of invisible connections between the diseases of the skin and the other organs and fluids of the body. In other words, he sees nothing exceptional in cutaneous pathology in its relations of dependence to the general economy. In the chapter on general diagnosis the directions given with regard to methods to be used in determining the nature of individual affections are excellent in point of explicitness.

The author's views on internal therapeutics may be well stated in his own words:—

"There are no remedies to be given by the mouth which can be described as certainly and specifically curative of the diseases of the skin. The number of medicinal agents employed with this end is incredibly large, . . . but, with the few exceptions given below, not one of these is known to exercise the slightest remedial action upon the surface of the body. . . . Those possessed of some value are arsenic, mercury, iodine, cod-liver oil, quinine, ergot, and carbolic acid. Of them all, it may be said that, while each possesses a wide range of usefulness, no one of them in any case can be certainly trusted to produce a given effect; and each, in many cases, is either positively prejudicial, or without efficacy of any kind."

It will be seen that he recognizes no "specifics" or routine remedies; none the less will it be found that his treatment is thoroughly satisfactory in its completeness and practical minuteness. We know of no more judicious guide to be followed by the practitioner in the management of the most unmanageable affections of this class.

It is hardly to be expected that any one will write a book on dermatology and refrain from trying his hand at a new system of classification, however much he may, at the same time, lament the great number already in existence. The scheme of the author is based upon that of Hebra in the main, the affections being redistributed according to the regions or tissues involved. It recognizes ten classes, as follows: 1. "Involving predominantly the component parts of the epidermis and derma, and incidentally the appendages of the skin." Under this are arranged a majority of the hyperemic, exudative, hypertrophic, atrophic, and neoplastic processes of the skin. 2. Of the sebaceous glands and periglandular tissues. 3. Of the sweat glands and periglandular tissues. 4. Of the hairs, hair-follicles, and perifollicular tissues. 5. Of the nails. 6. Of the blood and lymph vessels and perivascular tissues. 7. Of the nerves. 8. Of the pigment. 9. Of the skin with involvement of other organs. 10. Of the skin and its appendages, all parasitic. Although, on some accounts, it may be convenient to find all diseases of any one anatomical structure considered together, yet the more important pathological relationships are thus violently put asunder, and absolute consistency in such an arrangement is impossible, as disease does not limit itself to any one structure or region in most cutaneous affections. There is no good reason made apparent for the creation of class 9, or for the separation of the diseases of which it is composed from those of a similar nature in class 1.

In the second part of the volume individual diseases are treated of in the order indicated in the above classification, and in the usual method. The descriptions are generally clear and graphic, and due attention is given to the structural changes, which are often illustrated by cuts taken mostly from the works of recent investigators in this field of research. It is the treatment which the author has presented with the greatest fulness, and here certainly nothing has been omitted which an extensive knowledge of the literature of the subject, and especially a large experience with the *materia medica* of dermatology could supply. He has, as a rule, tried to prove all things before recommending them to his readers, and has only occasionally advised the use of remedies the merits of which rest upon mere theory or insufficient evidence.

Our comments upon his presentation of the various affections must be brief. The varieties of erythema seem to us to have received far too little attention, some of them being noticed almost by title only, erythema nodosum even being dismissed with but eight lines. Dr. Hyde recognizes four principal clinical types of eczema, the erythematous, vesicular, pustular, and papular, with, of course, other varieties according to seat, cause, duration, etc. He expresses the opinion, contrary to that held by most dermatologists, that it is not first in order of frequency among cutaneous diseases, but that it occupies a second rank in this respect to acne. He holds this belief, in spite of statistics, "by observation of the faces of individuals on the streets of any large city." This might possibly teach us that acne of the face is more common than eczema of the face, certainly nothing more, for eczema of every other part of the non-exposed surface is extremely common, whereas acne rarely affects any portion of the body when the face is exempt.

Acne, moreover, occurs to any great extent only during a limited period of life, while eczema spares no age. But statistics are more reliable than impressions, and in this direction their teachings cannot be misinterpreted. Of nearly sixty thousand cases of skin disease, taken from the private and dispensary practice of approved dermatologists in the United States, eczema formed 31.5 per cent., while acne formed but 7 per cent.; and in Europe, in 48,000 cases of the same class, reported by well-known dermatologists, eczema occurred in the ratio of 23 per cent., acne in 2.4 per cent. The author's views regarding the much-discussed etiological relations of eczema to local or general conditions of the system may be best given in his own words:—

“Eczematous affections occur in the persons of individuals who are in every respect superb examples of good health. They occur also in persons who are affected with every form of bodily ailment; such coincidences, however, scarcely furnish a satisfactory etiological basis, unless a certain degree of constancy between eczema and these disorders could be established. It should be added that every phase of eczema can be artificially produced upon the surface of the skin by the action of external irritants. Several authors take exception to this view, claiming that the induced disease is an artificial dermatitis, but they fail to point out the distinctive objective differences between such dermatitis and eczema. They content themselves with observing the subsequent evolution of the malady, and pronounce that to be an eczema which fails to respond promptly to treatment, and that a dermatitis which is capable of speedy relief. The climax of such absurdity is reached when they are shown obstinate cases of eczema of artificial origin, and the response is, that the induced dermatitis gave rise to an eczema in a predisposed subject.”

The treatment of the disease laid down is consistent with these views of its etiology, viz., “there is no constitutional treatment of the diseases save that which excludes all sources of irritation.” We find, accordingly, but one drug credited with any power over it when administered internally, viz., arsenic, and this receives but faint approval.

“It has been my ill fortune,” he says, “to observe so many obstinate forms of squamous and papular eczema aggravated by its employment, that I should consider an acquaintance with a dozen patients relieved by its use in a single year a circumstance suggestive of as much curiosity as congratulation.”

His directions for the use of local remedies, on the other hand, are exhaustive, and given with minute detail. Stress is laid upon the necessity of soothing management as the most important guide in our choice of applications. The special treatment for local forms of the affection is well given.

In connection with his remarks on herpes progenitalis, the author states his belief that it is “always the result of naturally or unnaturally induced erethism.” How proximately this relation is supposed to hold he does not state. It certainly occurs in some cases as an almost constantly recurring or permanent affection for several years, and without any immediate sexual element of causation. He recognizes the individuality of the pseudo herpes iris, more appropriately to be regarded, we think, as an erythema bullosum. In the grave prognosis he attaches to herpes zoster, he undoubtedly intended that his remarks should apply to the facial form only. In his remarks upon the etiology of impetigo contagiosa, he states that it “must first at least occur in the skin of a patient who has lately suffered from a contagious disease (varicella, variola, vaccinia).” We should say that either his definition or experience was too limited, for its coincidence

with such affections under our observation is certainly very rare in comparison with its whole occurrence.

To his description of the "primary lesion" of psoriasis—that it is a macule of "reddish-brown" tint—we must also object as inaccurate, for the redness which characterizes the hyperæmia is generally as fresh coloured in the beginning as in any other inflammatory process of equal grade, and the duller colour alluded to marks and is caused by the chronic duration of the efflorescence. The author differs, too, from most writers in the opinion he expresses that the disease is not hereditary. He displaces pemphigus foliaceus from its connection with simple pemphigus, and gives it a close alliance with pityriasis rubra, on very insufficient grounds it seems to us. The so-called molluscum contagiosum, in accordance with a majority of the latest observers, he places among the hypertrophies of the epithelial layer, but there is no apparent reason why it should be separated from other keratoses. The plate illustrating the affection seems to us ill-chosen. In his very brief description of elephantiasis we looked for some account of the recent and very interesting investigations upon the filariæ of the blood of patients and mosquitoes, but in vain. The author adheres to the very inappropriate name xeroderma to denote the little understood affection entitled angioma pigmentosum et atrophicum by the American Dermatological Association, which has at least the merit of being descriptive. The retention of the term molluscum in connection with fibroma of the skin is also to be regretted, as tending to perpetuate confusion in nomenclature. In explanation of the more frequent occurrence of baldness in men than in women his reason is hardly satisfactory. "The latter," he says, "usually wear an exceedingly light covering for the head, while men encase the latter with tight-fitting caps, which interfere with proper æration of the scalp." *Per contra*, men wear their hair short; baldness affects, we should say, men of sedentary habits, who keep their heads mostly uncovered, rather than out-door labourers; and women cover up a large part of the scalp with thick braids, etc., which must cause the heat of these parts to be largely retained. The causes of this sexual inequality must be sought in other conditions apparently. In connection with the causes of alopecia areata, the author dismisses the parasitic theory very abruptly, with the statement that no parasite can be discovered. It might be considered due to the character of the by no means few and even recent observers who claim that they have found it, that the statement should have been made, at least, that a difference of opinion exists upon this point. In connection with the pigmentary affections, the author expresses the very surprising opinion that in vitiligo "the changes are probably due to the influence of the sweat in washing the pigment to the surface."

Dr. Hyde does not believe in the contagiousness of leprosy, but certainly in these days of its revival in our midst we need stronger evidence in rebuttal of the testimony presented in support of this doctrine by modern instances than references to confused biblical accounts simply. Neither does he recognize any etiological relations in the occurrence of the so-called bacillus lepræ; indeed, he regards its presence in leprosy tissues as accidental, not constant, and itself as "identical with the bacteria which form in an infusion of hay." He adds in a foot-note that the forms presented by the bacillus lepræ and bacillus tuberculosis can be artificially produced by the formation of rod-like crystals of margaric acid. This, to say the least, is a very summary way of disposing of the results of the investigations of many scientific observers, who are perfectly com-

petent to distinguish one form of growth from another, and who are incapable of mistaking a crystal for a plant. The question of the parasitic nature of leprosy is not yet solved, but it is in trained and reliable hands.

The chapter on the syphilodermata is one of the best in the book, the descriptions being graphic, and the directions for treatment given with great detail and care. In his remarks upon the etiology of the vegetable-parasitic diseases, he seems to attach weight to the opinion expressed by some writers—that an appropriate soil is needed for the germination of the fungus, “some individuals being thus predisposed to its invasion.” On another page he says:—

“I lately treated a physician for ringworm of the bearded chin and cheek, derived from the face of a little patient under his care. He subsequently gave tinea circinata to his wife, who suffered on the face and shoulder, and she, in turn, communicated tinea tonsurans to her daughter.”

Such observations could be supported by much more striking instances of the indifference of the parasite to the personality of its host, when the conditions for its attachment are favourable.

There are, of course, many other points of minor importance upon which the author and his critic might differ, but we can heartily commend the book as a valuable addition to our literature, and a reliable guide to students and practitioners in their studies and practice. J. C. W.

ART. XXIX.—*La Trichine et la Trichinose.* Par JOANNES CHATIN, Maître de Conférence à la Faculté des Sciences de Paris. Professeur Agrégé à l'Ecole Supérieure de Pharmacie. Avec 11 planches. Paris: J. B. Baillière et fils, 1883.

FRANCE has enjoyed a singular immunity from trichinous disease, and the interest in the subject was purely scientific until the occurrence of a few cases, and the suspicion that American pork was to blame aroused public alarm, and the question has now become one of almost international importance. By a decree of February 15, 1881, the importation of salted meats from America was prohibited, but as almost all of it was consigned to Havre, it was decided to establish a laboratory of inspection at that port and submit every piece of pork to microscopical examination. M. Chatin was appointed director of the laboratory, and for four months superintended the observations. This work is largely the outcome of the experience thus obtained, and is a tolerably complete monograph on the life history of the trichina, and its relations to public health.

The results of the work at Havre are of special interest to us. A staff of about forty examiners was employed, and the mode of procedure was to open the casks of barrels, take a specimen from each piece, carefully mark both, and then cut eight or ten sections, and examine in weak salt solution with a power of about 70 diameters. If the specimen was found infested with trichinae, the piece from which it was obtained was picked out and destroyed. It was found that one person could examine about twelve casks in the day, each containing twelve long sides of bacon.

In all, 7418 casks, barrels, or crates were inspected, containing 103,528

pieces, with the following results: In one set of 3444 barrels 14.60 per cent. contained trichinous meat. Of the 53,318 pieces in these barrels, 1087 were affected: *i. e.*, 2.03 per cent. In another set of 3971 barrels, 14.64 per cent. contained infested pieces, and of the entire pieces, 50,210 in number, 1.97 per cent. contained trichinæ. Long sides, short sides, shoulders, and hams, made up the great bulk of the meat, and the percentage ranged from 1.29 in the hams, to 2.49 in the short sides. Trichinæ were found in 14 out of 15 casks of sausages, and in two casks of intestines the parasites were detected encysted in the muscular walls of the bowels. The ratio here given corresponds closely with that found in Germany in 1879, when 2 per cent. of American pork and 1.9 per cent. of native hogs were found trichinous.

These foreign results are not surprising with the records before us of the inspections which have been made in this country. Mr. Billings, of Boston, found, in a large number of examinations (over 6000), the proportion of trichinous hogs in the different groups from 1 in 17 to 1 in 44. We do not know on what authority the statement, quoted by M. Chatin, is made that the Chicago Board of Health estimated 8 per cent. of the hogs slaughtered in that city to be affected, but there can be no doubt, even from the limited investigations which have been made, that the trichina prevails to an alarming extent in western animals. No wonder, with the Havre record before them, the French do not want American pork, not only on account of the possible danger of direct infection, but also from the likelihood of contamination of the native stock, so far remarkably free from the disease.

Among points of interest discussed in the volume, a few may be mentioned. The belief prevails widely that the trichinæ are confined to the muscular system, and do not infest the connective tissues and fat. M. Chatin and his staff have frequently found them both in the natural fat and in lard, and have produced the disease by feeding these substances to animals. An important question is the effect of the salting and smoking processes on the vitality of the parasites. Though prolonged pickling may kill them, the experience at Havre clearly shows that the ordinary processes of curing as carried out in this country have but little influence. Repeated experiments proved that animals were readily infected when fed with portions of salted or smoked ham and bacon containing the parasites. One experiment of Fourment is worth noting, as it demonstrates the power of resistance to salting possessed by trichinæ. On the 19th of April, 1881, a piece was taken from an infested side of bacon, placed in a bottle, covered completely with salt, and the cork sealed. It was opened on the 1st of April, 1882, and the piece removed. After soaking in water for several hours, portions of it were fed to a mouse on the 4th, 5th, and 6th of April. The animal died on the 7th, and perfectly developed sexual trichinæ were found in the intestines. A second mouse, fed in the same way, died on the 13th day. It is evident that the pickling processes offer very slight protection, if, indeed, they have any influence whatever on the parasites. It is well known that many of the epidemics have been caused by eating smoked and salted ham or bacon. In the section on the action of heat and cold in the trichinæ the author brings forward many facts to show that even in an apparently well-cooked piece, the temperature may not, particularly if it is a large joint, have been sufficient to kill them. In thick portions like hams, it is difficult, even on prolonged boiling, to get the central parts to a temperature adequately high. This may explain

the fact that in certain outbreaks those who partook of the infected flesh were unequally affected, some slightly or not at all, others severely, depending, no doubt, on the portion of the joint of which they had eaten.

These thorough and careful French investigations should receive the attention of the government and of the large western packers, as they give an additional warrant to European countries of the dangers of American pork, and justify the prohibitory measures which many of them have adopted. When a trade is interfered with, pressure enough can usually be exercised to have suitable inquiries made, and reforms effected, if not in the interest of public health at least in those of commerce. An official compulsory inspection should be instituted in the large pork-packing establishments which would in the first place give more satisfactory evidence than we have at present of the degree of infection of our hogs, and would, moreover, do much to remove the alarm at present existing in Europe. Without it the present embargo is not likely to be cancelled. Endeavours should be made to establish the mode of infection of the animals, and the period at which they get the disease. These are questions as yet unsettled, but upon which a committee of investigation might obtain valuable evidence.

The enormous losses entailed by the compulsory slaughter of cattle at the ports of debarkation, and by the embargo which has been placed on American pork, should open the eyes of our legislators to the importance of taking proper measures to prevent the spread of existing animal plagues, or to stamp them out altogether. It is surprising, considering the vast stock interests of the country, how far behind we are in the study of comparative pathology, and in all matters of veterinary police and quarantine. Let us hope that the steps in this direction which the government has taken in the past few years, indicate that at length public opinion has reached a point which makes the necessary legislation not only practicable but imperative.

W. O.

ART. XXX.—*A System of Human Anatomy, including its Medical and Surgical Relations.* By HARRISON ALLEN, M.D., Prof. of Physiology in the University of Pennsylvania, etc. etc. Philadelphia: Henry C. Lea's Son & Co., 1882-3.

FEW professional books, perhaps none, have ever been published in this country the appearance of which was more eagerly looked forward to than the one under review. For years "in preparation" and "in press," it is now issued not as a completed work but in fasciculi, four of which are in the hands of our readers; the first being devoted to *histology*, and written by Dr. Shakespeare; the second to the *bones and joints*; the third to the *muscles*; and the fourth to the *heart and bloodvessels*.

The scope of the work is far beyond that usual to treatises on Anatomy, the author's aim being to present to his readers not only anatomical details, but such practical applications and illustrations as must serve to fix the facts in mind and show the great value of accurate knowledge of the structure and relations of the various parts of the body in the diagnosis

and treatment of their diseases and injuries. Reserving all remarks respecting the real value of the work as a text-book for students and reference volume for practitioners until such future time as we shall have it in its entirety, we will now merely notice certain of the statements that have attracted our attention in a rather hurried reading of the issued parts.

Before doing so, however, a peculiarity of anatomical nomenclature must be referred to, one which will, we fear, prove confusing if not positively misleading to many readers. Instead of the ordinarily employed *inner* and *outer*, *internal* and *external*, we find substituted *median* and *lateral*; and further, in the limbs the line of reference is not the long axis of the body, but that of the limb itself. We shall see hereafter when referring to the relative positions of the femoral artery and vein, how readily this change in nomenclature, scientific though it may be, may work mischief to students and patients.

Section 1, devoted to histology, and written by Dr. E. O. Shakespeare, presents in a clear and succinct manner the general characteristics and peculiarities of the various tissues, and is well illustrated by numerous figures well selected and clearly drawn.

In section 2, the largest of any as yet issued, the bones and joints are treated of; and it is full of practical references and suggestions. Though occasionally incorrect statements are met with, they may without doubt be attributed to defective proof-reading. For example, though when treating of the sacrum it is declared that the posterior surface is narrower than the anterior, later on we find that "the sacrum being *broader behind than in front* would slip forward if the motions were not checked by the stout ligaments uniting it with the innominate bone." Again, in describing the ulna, the *external* lateral ligament is stated to be attached to its styloid process, while in treating of the wrist-joint ligaments the *internal* lateral is given as attached to the "spinous process of the ulna;" to the scaphoid tubercle it is in one place declared that the *internal* lateral ligament is attached, in another the *external*; and to the cuneiform the *external* lateral (p. 180), the *internal* (p. 224). Again, the smooth anterior surface of the upper third of the tibia receives, we are told, "the aponeurosis made up of the expanded tendons of the sartorius, the gracilis, and the *semi-membranosus*." Such errors as these have evidently resulted from oversight in proof-reading; as also others in various parts of the work, such as *labium major* (twice repeated in one paragraph), *pubis*, *septæ*, etc.

Section 3, devoted to the consideration of muscles and fasciæ, occupies nearly a hundred pages, and is illustrated by many plates of varying degrees of excellence, not a few of them being of decidedly inferior character.

As usual, the *occipito-frontalis* is described as a double-bellied muscle, with its broad aponeurotic middle portion. It certainly ought to be regarded as two independent sets of superficial muscular fibres inserted into the deep fascia, and serving as tensors and movers of the same.

The *buccinator* is declared to belong "more properly to the pharyngeal constrictor group;" and the office of the *tensor palati* probably to be to dilate the orifice of the Eustachian tube. The insertion of the *sternocleido-mastoid* is given as the mastoid process, and its use to flex the head on the neck, neither of which statements, while the truth, is the whole truth. The *quadratus lumborum*, instead of being "incised in colotomy and in nephrotomy," ought, by its outer margin, to furnish a starting point for the deep cut, whether made obliquely or transversely. The *rhomboids*

are regarded as antagonists of the *serratus magnus*, instead of serving to carry the insertion of the latter over to the spine.

Though reference is duly made to the occasional congenital absence of so much of the long head of the *biceps cubiti* as lies above the bicipital groove, as also to its absorption in certain cases of chronic rheumatoid arthritis, neither in this section nor in that on the ligaments is it shown that, probably, it is primarily a shoulder-joint ligament, the action of which is greatly intensified by its connection with the muscle; and that anatomically, and especially pathologically, it has strong analogies with the ligamentum teres of the hip-joint. The *flexor carpi ulnaris* is stated to be supplied by the *median* nerve.

In the paragraphs on inguinal hernia, the direct variety is declared to push before it the conjoined tendon, though notice is taken of Agnew's doubts upon this subject. How is it possible for a firm layer of white, fibrous, non-elastic tissue to be pushed ahead of a knuckle of bowel or a mass of omentum, and carried beyond the external abdominal ring? Where is there a record of a post-mortem examination which has unquestionably proved that what is apparently an anatomical impossibility may be a pathological verity? Though we have long and faithfully searched for such, we have never found it; nor indeed do we ever expect to. For the relief of a constricted femoral hernia, either Hey's ligament or Poupart's ligament is said to require nicking, no mention being made of Gimbernat's, which much more often than Poupart's is the one requiring to be cut. In fracture of the *coracoid* (!) process of the ulna, we find it written that "the severed tip is drawn upward by the *brachialis anticus*," though, in fact, the muscle is not attached to the tip but the basal part of the anterior surface.

Section 4 is devoted to the consideration of the vascular system. On page 338 it is stated that "Dr. J. H. Brinton and Mr. Rivington, however, have demonstrated the presence of a valve at the junction of the right spermatic and the renal veins;" later on (page 436), Brinton's and Rivington's views are correctly stated. The *transverse portion* of the *arch of the aorta* we find to extend "from the right second costal cartilage to the intervertebral substance between the fifth and the sixth dorsal vertebra," and the *descending portion* "from above the tracheal bifurcation at the second dorsal vertebra to the lower border of the third dorsal vertebra."

The student who reads the following paragraphs will, we are sure, get a curious idea, if any at all. "The right (carotid) artery arises from about the level of the second dorsal vertebra. As it lies within the thorax it is more superficial than the left, and is seen at its origin nearly in the median line, but inclines to the right and lies at the base of the neck behind the sterno-clavicular articulation. Over it is the right innominate vein. The subclavian vein lies to the outer side. The left artery is longer than the right, and is the more deeply seated. It ascends nearly vertically, and lies on the trachea and œsophagus. Behind it is the thoracic duct. It is crossed by the right innominate vein."

The *communicans noni* nerve is stated to sometimes lie within the sheath of the great vessels; though it is true that, occasionally, the junction of the *communicans* and *descendens* takes place within the sheath, is it not the latter nerve which is here referred to? Direction is given to expose, when practicable, the external carotid "at its origin from the common carotid to be sure of ligating the main trunk below the point of origin of

the superior thyroid;" the point of election in the ligaturing of this vessel is between the superior thyroid and the lingual. The *internal mammary* passes "downward beneath the pleura along the posterior surface and near the border of the sternum." If so, how and where is it to be tied? The *posterior interosseous* is located *below* instead of *between* the superficial and deep layer of muscles. The origin of the *middle hæmorrhoidal* is given as from the first stage of the internal pudic. In the statement of Holden's direction for finding the gluteal artery, the *trochanter minor* is given instead of *major*. In ligaturing the *common femoral*, the needle is directed to be passed "from without inward, to avoid the vein which lies to the outer side of the artery." Correct as this statement is, using the terms inner and outer as the author does with reference to the median line of the limb, it is so directly contrary to what is usually understood that it is to be regretted that the terms were employed at all; for by the majority of readers their meaning will certainly be misapprehended. No notice is made of the possible origin of the *deep epigastric* from the *profunda*. The *nutrient artery* of the *tibia* is stated to be a branch of the *peroneal*. The *anterior tibial* in the lower portion of the leg is declared to lie between the *tibialis anticus* and the *extensor longus*, and to be crossed at the ankle by the tendon of the *tibialis anticus* muscle. In the ligation of the upper part of this artery the line of direction, it is said, "can be defined by exciting contraction of the *tibialis anticus* muscle," no reference being made to the white line which so generally marks the first intermuscular space.

P. S. C.

ART. XXXI.—*Quain's Elements of Anatomy*. Edited by ALLEN THOMSON, M.D., D.C.L., LL.D., F.R.S., EDWARD SCHÄFER, F.R.S., and GEORGE DANCER THANE. Ninth Edition. 2 vols. 8vo., pp. xiii., 748, and ix., 947. New York: Wm. Wood & Co., 1882.

NINE editions and eight authors and editors attest unusual worth in any work originally published by Dr. Jones Quain, who also revised the following three editions. The work has passed through the hands of such men as Richard Quain, Sharpey, Ellis, Cleland, and the present editors. Comparing the earlier editions and the present one, it is surprising to see how the book has changed. Like the boy's penknife, first the new blade, and then the new handle, and yet still the same knife, so in successive editions, additions, alterations, and improvements have left but little of the original save the title. Unquestionably, it is the foremost work on Systematic Anatomy published in the language. The first volume contains the anatomy of the bones, joints, muscles, bloodvessels and nerves, and of the superficies of the body, and has been revised by that accomplished anatomist Professor Thane; the second volume contains, histology and splanchnology, which have been revised by Professor Schäfer, eminently fitted for the work as a physiologist, and embryology, which has been revised by the veteran Professor Thomson, who has been associated with the two previous editions of the work. A number of the old cuts have been displaced to advantage, and in any later edition we trust this work of substitution will be still further carried

out, for any one who will compare the older cuts with the later, and especially with the reproductions of Hirschfeldt's plates from Sappey, will be struck with the great improvements thus effected. If Mr. Heath's plan with numerical reference marks were followed, of having all the odd numbers in succession on one side, and the even ones on the other, it would also be a great improvement.

Moreover we object to "highly magnified," "much magnified," and similar terms so often employed in the explanation of the cuts. Where they are borrowed it is often perhaps unavoidable, but in original cuts such indefinite terms are always to be avoided; the precise power used should be stated. In no other way can exact knowledge be imparted.

We do not like the plan of separate indexes for each volume, and, moreover, they are not as full as they should be, but when we compare them with French works we are satisfied. For accurate proof-reading we have never seen a better book; only three misprints are noted in the "errata," and in a pretty thorough examination of the text, we have not discovered a fourth. As to the text there is little to be said save in commendation. Any book nearing its decade of revisions has received the stamp of professional approval that would outweigh any criticism. We can especially commend the bibliography of recent literature, which is added to each part, as a most useful and valuable point. This is particularly full in the section on embryology.

W. W. K.

ART. XXXII.—*Transfusion: Its History, Indications, and Modes of Application.* By CHAS. EGERTON JENNINGS, L.R.C.P. Lond., etc. With Engravings illustrating the Author's Siphon for Intravenous Injection and Immediate Transfusion, and a Bibliographical Index. 8vo. pp. viii. 69. London: Ballière, Tindall, and Cox, 1883.

THE introduction of this very interesting monograph opens in the following graphic and attractive way:—

"Students, with smiling faces, are rapidly leaving the theatre of one of our metropolitan hospitals. The most brilliant operator of the day has just performed immediate transfusion with the greatest success. By means of a very beautiful instrument, the most complex and ingenious that modern science has as yet produced, a skilful surgeon has transfused half a pint, or perhaps a pint, of blood from a healthy individual to a fellow-creature profoundly collapsed from the effects of severe hemorrhage. Some little difficulty was experienced prior to the operation, as one of the many stopcocks of the transfusion apparatus was found to work stiffly; but this error was quickly rectified by a mechanic in attendance. Towards the close of the operation the blood-donor, a powerful and heavy young man, swooned. Two porters carried him into an adjoining room, his wounded arm being bandaged up, *secundum artem*, by energetic dressers. Diffusible stimuli were exhibited by the mouth, nostrils, rectum, and skin. The man rallied in due course, being well cared for by a group of students and nurses deputed to look after him: The wound in his arm will probably heal speedily, or a few weeks later he may possibly apply at the out-patient department of the hospital, presenting an ugly-looking, pulsatile tumour, associated with a thrill and rasping bruit, connected with the vessels in the cubital triangle, a most unfortunate accident having clearly happened here, of which a record promptly appears in the columns of the *Lancet*."

This account is followed by the narration of an imaginary case of *post-partum* hemorrhage, occurring under the care of a solitary practitioner in the country, where none of the conveniences of the brilliant operation are at hand, and where disappointment and discredit are the consequence of the attempt to imitate it. Then the question is put, whether or not the operation of transfusion can be considered one of universal applicability.

Objections founded upon cases in which death soon results, the author treats with a certain amount of scorn, insinuating that intra-uterine injections of hot water may have led to air entering the uterine sinuses, falsely charged to the transfusion, or that similar injections of perchloride of iron may have given rise to an embolus, no blame attaching to the transfusion apparatus.

Nevertheless, he recognizes the importance of the objections urged against transfusion, and advises meeting them by simplifying the operation. The first step in this simplification consists in dispensing with blood, and employing an artificial substitute. The second consists in using an uncomplicated apparatus.

The chapter on the History of Transfusion is brief, but interesting, the earlier attempts indicating, what has since been apparently clearly proved, that the admission of a moderate amount of air into a vein cannot be regarded as necessarily fatal to the recipient. For, in all the experiments of Lower, in England, in 1665, the communication between donor and receiver was made by a number of quills, which were joined together after being connected with the "*Carotidal* arterie" of one dog and the "*Jugular* vein" of another—air of course, filling all the quills.

In the chapter on the Prospects and Indications of Transfusion nearly fifty *per cent.* of recorded cases are said to have recovered. This estimate, however, is founded upon a combination of several tables of statistics, which may have contained duplicates. Yet, even if a much smaller proportion of such operations were successful, it would warrant the attempt to save life by means of it.

The reading and experience of the author lead him to conclude that the direct method of transfusion is only applicable to a small number of cases, and only practicable with skilled assistance and hospital appliances. The causes of failure of the operation, he thinks, can all be obviated, and that its dangers "are not greater than those which attend venesection and other minor operations on the venous system." As illustrating the handicapping which a method is sometimes subjected to, he introduces the report of a case of *ante-partum* hemorrhage, under the care of Dr. Braxton-Hicks, which suggests—what further on he plainly states—that the fatal result was not due to the transfusion, but to an unwise obstetrical procedure. In contrast to this he cites a similar case of his own, where a conservative obstetrical management, combined with transfusion according to the plan he advocates, was followed by a rapid recovery. In this connection the course of the book is broken to admit a sensible argument in favour of the conservative treatment of cases of *ante-partum* hemorrhage, and by a somewhat intemperate opposition of Dr. Barnes and styptic intra-uterine injections of perchloride of iron.

The next and last chapter discusses the way to execute the operation of transfusion. Here, again, the difficulties and dangers of immediate transfusion come up and are dwelt upon in detail, and the conclusion, which is a matter of common experience, announced that this method is far from being generally feasible. The use of the blood of other species of animals,

and of human blood the corpuseles of which have been disorganized, the author would reject as unsafe. Equally does he object to the employment of phosphate of soda, as recommended by Dr. Braxton-Hicks, to prevent fibrination. His preference is strongly in favour of the transfusion of a saline solution made as follows:—

Chloride of Sodium	50 grains.
Chloride of Potassium	3 “
Sulphate of Sodium	2.5 “
Carbonate of Sodium	2.5 “
Phosphate of Sodium (Na_3PO_4)	2 “
Water (100° Fahr.)	20 ounces.
Alcohol (absolute)	2 drachms.

The apparatus he prefers is a simple siphon with a suitable canula, and one or two other slight additions to adapt it to its object.

It will be seen from this analysis that our author is a person of positive convictions and equally positive assertions, while his experience is calculated to encourage testing the method he recommends. It certainly appears that the primary advantage of transfusion consists in the supply of a fluid of proper physical composition to fill the flaccid bloodvessels and give the heart something to act upon. If the whole volume of blood were lost, nothing but blood could fitly take its place. But when only a relatively small proportion has flowed off, a simple saline solution may be of great service. The author's apparatus also commends itself to the judgment, as meeting all the indispensable indications, without being of a complexity which would make mishaps probable.

So much for the matter of this book. The manner, as intimated already, is in the main attractive. There are some infelicities of expression, some inconsistencies of wording (as in his formula, which we have harmonized in quoting it), some abrupt transitions from one part of the subject to another which might be improved, and the end comes so suddenly that one is surprised, on turning the page, to find that he has reached it. Nevertheless, as a whole, this monograph is interesting as well as instructive, and it prompts the hope that the author may continue his study of the subject of transfusion, and, when the proper time arrives, give the medical public the result of his increased experience and more mature reflection.

C. W. D.

ART. XXXIII.—*A Manual of Chemical Analysis as applied to the Examination of Medicinal Chemicals. A Guide for the Determination of their Identity and Quality, and for the Detection of Impurities and Adulterations. For the Use of Pharmacists, Physicians, Druggists, Manufacturing Chemists, and Pharmaceutical and Medical Students.* Third edition, thoroughly revised and greatly enlarged. By FREDERICK HOFFMANN, A.M., Ph.D., Public Analyst to the State of New York, and FREDERICK B. POWER, Ph.D., Professor of Analytical Chemistry in the Philadelphia College of Pharmacy. 8vo. pp. 624. Philadelphia: Henry C. Lea's Son & Co., 1883.

THE volume before us has been greatly improved since the first edition was issued ten years ago. The great advances made in chemical science

during this time, and the many contributions to our knowledge of better methods of analysis, necessitated the elimination of much old matter, and the insertion of many additional processes. The reappearance of this valuable manual is timely, following as it does closely upon the publication of the Pharmacopœia of 1880; and the need of a work of this character is very apparent, because of the introduction for the first time into the Pharmacopœia of volumetric tests. It will thus be seen that pharmacists and physicians who are required to ascertain the purity of the chemicals which they use, naturally desire a practical guide which will comment upon, and explain the action of the pharmacopœial and other tests. The work is divided into two parts. Part I. treats of Analytical Operations, Reagents, Test Solutions, a course on Qualitative and Volumetric Analysis, and Alkaloids. In Part II. medicinal chemicals are taken up in detail, their physical properties described, and then their analytical examination for identity and purity follows. Each article is treated without referring to others which precede or succeed it, and the illustrations are frequently repeated, so that very little back reference is needed. The saving in space which was secured by the omission of book and journal references, is, however, in our opinion, not judicious economy in a work of this kind, as it very frequently happens that the particular information sought by the reader has, unfortunately, not been selected by the author in his quotation; the book or journal reference, however, measurably corrects an omission which must necessarily be unavoidable, as the most exacting reader cannot expect to find in a manual articles reproduced *in toto*. With the additions that have been made to Part II. it will now be found that the physical and chemical properties of nearly all of the important chemicals used in medicine are described briefly but sufficiently, with such tests for this recognition as are necessary. Methods for the detection of accidental impurities or intentional adulterations are also given, and these cannot fail to be of the utmost service to physicians and druggists who are compelled usually to rely upon the reputation of the commercial houses that they deal with. In the case of those chemicals which are likely to be used as poisons, methods are described for their recognition which will be very useful in judicial investigations. At the end of the volume will be found tables which give the symbols and atomic weights of the elementary bodies and thermometric equivalents; one for the conversion of metric measures of capacity into United States fluid measures, one for the conversion of United States fluid measures into metric measures of capacity, with similar tables for the conversion of metric weights into troy weights, and *vice versa*.

That this manual will prove a useful guide to physicians, pharmacists, manufacturing chemists, pharmaceutical and medical students is but slight praise. A work of this character is absolutely necessary to those who expect to keep abreast of the advances made in chemical science, and who desire to loyally uphold the requirements of the recognized national authority, the Pharmacopœia of the United States of America (sixth decennial revision).

J. P. R.

ART. XXXIV.—*Das Naphthalin in der Heilkunde und in der Landwirtschaft.*

Naphthalin in Medicine and in Agriculture. By Dr. ERNST FISCHER, Privatdocent of Surgery in Strassburg. 8vo. pp. 98. Strassburg: Karl J. Trübner, 1883.

AFTER an account of the derivation and mode of preparation of pure naphthalin Dr. Fischer gives a history of its earliest use in medicine, from which we learn that it was first recommended by Rossignon, in 1842, as a substitute for camphor. It was to be compounded with a fatty excipient and used as a pomade for sprains and contusions, as well as to destroy insect parasites and parasites of the intestinal canal. In the same year Dupasquier recommended it as an expectorant in chronic bronchitis, especially in debilitated old persons. Likewise in 1842, Emery recommended it for the treatment of psoriasis, and these three endorsers led to a further endorsement, in 1851, by Wood and Bache, in the U. S. Dispensary. Later Hebra and Kaposi recorded adverse opinions of its merits in the treatment of skin diseases, while, in 1862, Kleinbans, having tried it in chronic eczema, found it less valuable than tar and oil of cade.

After this, it was taken up by the author and, after experimentation, strongly recommended as an antiseptic and parasiticide, beginning in the end of 1881, and continuing until the present time. His experiments have demonstrated that naphthalin has several advantages over most other antiseptics. It is innocuous to the higher orders of animals. Its disagreeable odour can be converted into an agreeable perfume by the addition of minimal quantities of oil of bergamot. It is absorbed through the digestive tract to but a slight extent, and most of what is so absorbed escapes in the urine.

When ordinary, impure naphthalin is applied freely to large wounds, it is absorbed and darkens the urine in the same way as carbolic acid, though in a lower degree; but without producing any symptoms of poisoning. Chemically pure naphthalin does not darken the urine; nor does it produce any local irritation, or even discomfort, when applied to the skin. It does not make crusts with the secretions of wounds, and so does not favour their retention. It does not irritate wounds or impair the process of granulation. The secretions of old ulcers and carcinomas become cleaner by the use of naphthalin.

This new agent has the merit of being very cheap, and its method of application calls for no special appliances, as it is to be simply strewn upon a wound and its bandages. Its purity must, however, be beyond question.

The disadvantages of naphthalin are: its insolubility in water and albuminoids; its disagreeable, although harmless odour; and the fact that it does not prevent very free secretion from the surface of large wounds.

The insolubility of naphthalin prevents its use for cleansing and protecting the hands and instruments of operators, as well as its application within wounds that are to be closed by suture. Its odour is not, however, more disagreeable than that of other antiseptics; and its permitting of free secretion, the author thinks, is not an important matter.

Dr. Fischer thinks naphthalin especially applicable in cases where the kidneys are diseased or very susceptible to the action of drugs; when the

skin is irritable, or there is a strong disposition to absorption; for children: for wounds, ulcerations, and so forth, in deep canals, like the vagina and bowel, where there is a tendency to decomposition of secretions; for resections; for the removal of tumours; for erysipelatous wounds; and finally, for the disinfection of hospitals and suppression of vermin. His experience in the application of naphthalin in minor and major surgery has been entirely satisfactory. It is noticeable that he advocates, though with some misgivings, thorough cleanness of instruments as a substitute for the asepsis which is usually secured in Lister's method, and which the insolubility of naphthalin debars him from obtaining by its means. His success with this substitution he would probably dislike to admit to be an argument against the exclusive value of antiseptics, which is the keystone of his, as well as of Lister's, faith.

The author carried out a number of experiments to determine the effect of naphthalin upon minute fungoid growths, and found that they were materially repressed or killed by an atmosphere saturated with the gas of naphthalin. When pus and blood were experimented upon the success was not so great.

The offensiveness of naphthalin to small animal parasites he found to be of advantage in diminishing the number of these in hospitals. Its application to skin diseases has not been marked with much success; nor has its use in internal diseases achieved any remarkable results.

The second part of Dr. Fischer's monograph treats of the use of naphthalin in agriculture. Here are found reports of experiments conducted under his supervision, or at his suggestion, which indicate that burying naphthalin near the roots of the vine has some influence in preventing the ravages of the phylloxera. The evidence of this influence was found in the vigour and number of rootlets as compared with those of unprotected vines near by—no statement in regard to fruit bearing is given. The author cites the opinions of a number of French observers and experimenters—most of them opposed to the claims of naphthalin—and endeavours to establish his own views. This is done but unsatisfactorily; and while an interesting contribution to the literature of the subject, this part of his essay is far from a conclusive one.

The monograph before us is the outcome of careful and methodical study, and is creditable to the honesty and industry of its author. Unfortunately it does not carry to the mind of the reader the conviction which is so plainly discoverable on the part of the writer. In the rage for antiseptics which shall not have the irritant properties of carbolic acid, the Germans have lately proposed the use of iodoform, turp powder, naphthalin and bismuth. There can be no doubt that each has some advantages as a dressing for surgical injuries, but none of them has secured for itself a position which promises to be permanent. This is the era of trial, not of judgment, and it is not surprising that what is lauded to-day is set aside to-morrow. Every honest attempt, however, adds to the evidence upon which the final opinion shall rest; and the author of this monograph has made a contribution in which a very manifest zeal has not led to the suppression of a single fact which might be used to combat his own position.

C. W. D.

ART. XXXV.—*Student's Guide to Diseases of the Eye*. By ED. NETTLESHIP, F.R.C.S., Ophthalmic Surgeon to St. Thomas's Hospital and to the Hospital for Sick Children. Second American from the second revised and enlarged English edition. *With a chapter on Examination for Colour Perception*, by WM. THOMSON, M.D., Prof. of Ophthalmology in the Jefferson Medical College. 8vo. pp. 416. Philadelphia: H. C. Lea's Son & Co., 1883.

THOUGH the last few years have been fruitful in ophthalmic manuals to an extent that has been thought to be suggestive of over-production, the early demand for a second edition of Nettleship's work proves that it at least has "fulfilled a want." Some changes and additions have been made which, it is thought, will adapt this edition still better to the needs of the class of readers for which it is intended. The author is unusually happy in the difficult task of being always brief and never obscure, and has produced an excellent epitome of the practical ophthalmic surgery of the present time. The medical and operative treatment recommended corresponds very closely to the general practice of ophthalmic hospitals in this country; almost the only decided exception is the use of the barbarous, and we had supposed obsolete, procedure of putting a seton in the temple for the relief of ulcer of the cornea and of chronic interstitial keratitis. This recommendation seems particularly unfortunate in the case of the latter disease, the cure of which depends so essentially upon internal medication and time.

The last chapter, on diseases of the eye in relation to general diseases, will be found particularly interesting and useful to the general practitioner.

The principal additions to the second edition are a chapter on "Optical Outlines," by the author, and one on "The Practical Examination of Railway Employés as to Colour-blindness and Acuteness of Vision," by Dr. Wm. Thomson. The former gives a very clear exposition of the elements of optics, the knowledge of which is necessary for the intelligent use of the ophthalmoscope and the correction of optical errors, and will be very useful to beginners and to those who cannot spare the time to go more deeply into the subject.

Dr. Thomson gives the plan that he has adopted for testing the employés of the Pennsylvania Railroad, and explains the use of his very ingenious instrument for the examination for colour-blindness. The object of the latter is to enable intelligent laymen to collect the facts in each case and record them in such a way that the professional expert can come to a correct decision without seeing the person examined. The report of 1388 examinations made in this way gives a percentage of colour-blindness fully up to the average found in examinations made directly by ophthalmic surgeons; and if more extended experience should confirm this encouraging result there will be hope of a practical solution of a much-discussed and most important problem.

The illustrations are numerous and most of them unusually good, and the paper and print are excellent.

G. C. H.

ART. XXXVI.—*Sore Throat: its Nature, Varieties, and Treatment; including the Connections between Affections of the Throat and other Diseases.* By PROSSER JAMES, M.D., Physician to the Hospital for Diseases of the Throat and Chest. Fourth edition, enlarged, with coloured plates and wood engravings. 12mo., pp. 318. Philadelphia: P. Blakiston, Son & Co., 1882.

THIS appears to be an unchanged reprint or reissue of the same edition of this work published in 1879, and therefore calling for little additional comment at this time. Dr. James has long been known as devoting himself to the department of throat diseases; having as long ago as 1859 employed reflected light for the purpose of applying local medication. His treatise is divided into three parts: 1. General preliminary sketch of the whole subject; 2. Diffused affections, by which he means affections not limited to any special structure; and 3. Diseases of individual organs. These subjects are discussed from the standpoint of a large personal experience, with very little allusion to contemporaneous authorities. His views are not always in general accord with those of physicians largely engaged in the same line of practice, and while they will not meet with the full approbation of his readers, it is of some importance that they should be carefully considered. We have to deprecate the far, far too frequent use of the pronoun *my*, an affectation which should be discarded by all who write in the vernacular. There are several instances in the volume before us where claims of originality are positively and inferentially made, which cannot be sustained by recorded evidence. For instance, the claim is made, and it has even been repeated by some of his English colleagues, that the use of steam vapour in the treatment of croup and diphtheria emanated from this author in 1861; and he alludes to it as "a recent outcome of German medicine;" while it ought to be well known, as a simple matter of history, that this valuable method received full recognition by Wanner, whose monograph, *Du Croup et de son traitement par le vapeur d'eau*, was published in Paris in 1834. An illustration, and the manner of allusion to it (p. 66), seem to claim the Mackenzie bracket and lamp; and so of other things.

Dr. James takes a much more hopeful view of laryngeal phthisis than the experience of most practitioners would seem to justify. It is but fair to him to state that similar prognostications, founded upon personal results, have been maintained for some time on this side of the Atlantic, by Professor Bosworth, of New York; though the latter advocates a special line of topical medication differing from that of the author.

We had hoped that the wretched coloured illustrations of this book would have been suppressed long ago. They are simply a disgrace to the text, to the author, and to the publisher.

In conclusion, we may safely commend the volume as the best of the smaller hand-books on the subject.

J. S. C.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

Partial Regeneration and New Formation of the Liver.

TISSONI, Professor of Pathology at Boulogne, in making some experiments in the spleen of a dog, accidentally wounded the liver. Six months afterward, on examining the wounded organ, he found a tumour at the site of the cut having all the characteristics of liver tissue. The tumour was prolonged in the form of a triangular tongue, about $\frac{1}{2}$ inch long, about $1\frac{1}{4}$ inch broad, and $\frac{1}{2}$ inch thick at its base, by which it was united to the border of the liver at the site of the original wound. In its centre was a large vessel with numerous collateral branches. The new growth was treated with bichromate of potash, hardened in alcohol, and numerous sections made. From a microscopical study of the sections Tissoni concludes that: 1. Under certain circumstances the liver may be reproduced at the wounded point; there was a new formation of the hepatic cells and of the biliary ducts in addition to those already existing. 2. Contrary to what takes place with the spleen, the great omentum adhering to the hepatic wound takes no part in the new formation of this organ and represents only the base and stroma in which the new tissue is born and developed. 3. The origin of the reproduced tissue is found in the pre-existing hepatic cells, which, by cellular multiplication, send out branches similar to the hepatic cylinders (*Leber-cylinder* of Remak) which are observed in the embryonic formation of that viscus. These branches are infiltrated in the omentum as the prolongations of an epithelial tumour infiltrate the connective tissue of the skin. The hepatic cells present numerous nuclei, which are readily coloured by carmine. 4. The cellular threads originating from the hepatic elements present, some, a central lumen, and have the characters of the bile-ducts; others are small, filled with protoplasm and nuclei, and have the appearance of hepatic cells. 5. The new liver cells, which are histologically similar to the old, are similar to the embryonic liver cells from which they are for some time separated by true blood-lacunæ. 6. The acinous arrangement is wanting, but the large bloodvessels, especially the veins, and large bile-ducts are seen. From this it may be concluded that the regeneration of the liver is in every way identical to its embryonic development described by Remak and Külliker.—*Journ. de Méd. de Paris*, April 28, 1883.

A New Crystalline and Coloured Body in the Urine.

PLOZ (*Zeits. f. physiolog. chemie*, Band vi. p. 505, 1882) has recorded the following which is of especial interest: A patient with pyelitis and chronic parenchymatous nephritis, presented in the sediment of the urine a crystallized and coloured material, bearing no analogy to any known substance. For some time the patient passed urine which was decomposed, alkaline, giving the ammonia and sulphuretted hydrogen reactions, very cloudy, with a sp. gr. of 1014. Microscopic examination showed pus-corpuscles, a few blood corpuscles, epithelial cells, and cylinders of various kinds, crystals of ammonio-magnesium phosphates, and a crystallized deposit of indigo-blue colour. On exposure to the air the surface of the urine took a greenish-brown colour, which disappeared when kept for some time in a closed vessel. On exposure to the air in a thin layer, the surface of the urine took a greenish-brown colour, passing to a permanent red. Microscopic examination showed that the quantity of indigo was increased, and that there also existed another crystallized substance of a violet-red colour, very distinct from the indigo crystals, forming needle-like bundles and rhombic tables. It was obtained by acidulating the urine with hydrochloric acid, then shaking in the presence of air in thin layers; then letting it stand for eight or ten hours until completely coloured; it was shaken up with alcohol or ether, which dissolved out the colouring matter with a trace of indigo, the presence of the latter being determined by spectrum analysis. The solution of this new substance in chloroform or ether presented characteristic absorption bands—one between D. and E., nearer to D., and two others between J. and F., nearer F. These bands differed completely from those of indigo, the bands of which were not seen. A solution of the substance in chloroform was neither affected by the presence of air, by boiling, nor by the action of acids or alkalis. On evaporation the solution left a few traces of indigo and red crystals. The patient died eight days after coming under observation, having taken no medicine. Ploz remarks that this substance has neither the characteristics of uro-erythrine nor uro-rubrohematin, and he is inclined to consider it as a new substance.—*Revue des Sciences Médicales*, April, 1883.

Urine Ferments and Fermentation.

BECHAMP, in a paper on this subject, draws the following conclusions: 1. Atmospheric germs cannot enter the bladder by the urethra; this is anatomically impossible. 2. Even supposing that ferment germs enter the bladder during catheterization, they are not the cause of ammoniacal fermentation. 3. Though the existence of atmospheric microzymes and their tendency to evolve into bacteria may be affirmed, it is certain that they are not the immediate cause of ammoniacal fermentation of the urine. 4. Bacteria may exist in the urine or in the bladder without ammoniacal fermentation taking place. 5. When urine becomes ammoniacal in the bladder the phenomenon is due to some morbid state of the urinary apparatus or to a diabetic state. 6. The fact that urine may be ammoniacal in the bladder, and that that state is due to the presence of infusoria, demonstrates that there is a functional difference between microzymes in the normal state and microzymes very similar to those of fermentation, which have become morbid on account of some lesion of the urinary apparatus or to some general diseased state. 7. The zymosis which causes fermentation of the urea is the result of morbid alterations of the function of the microzymes, for every soluble ferment is secreted by some organized substance, cell, or microzyme. 8. The ferments of ammoniacal fermentation may cause sugar and fecule fermentation. 9. There is an acid fermentation of urine, and the ferments of that fer-

mentation are similar to those of ammoniacal fermentation. These ferments also act on starch and cane sugar. 10. One can always, with the aid of carbolic acid or creasote, stop the evolution of microzymes in normal urine and its ammoniacal fermentation.—*Bull. de l'Acad. de Méd.*, 2me série, t. x.

Hemorrhage by Vaso-motor Irritation.

M. BROWN-SÉQUARD has observed hemorrhages under the occipito-atloid membrane and in the cavity of the fourth ventricle in birds whose neck had been cut off at the level of the fifth or sixth cervical vertebra. These hemorrhages did not result from the effusion of blood from the section and reascending toward the cervical region, for the intermediate space contained no effusion. He thinks that these hemorrhages are similar to those seen in different organs following lesion of the upper part of the cord, and refers them to a vaso-motor irritation produced by lesion of the central nervous system, and is inclined to explain them by this mechanism; the vaso-motor irritation producing at once energetic constriction of the arteries and veins, determines also a forcible projection of blood into the capillaries, the walls of which yield to the excess of internal pressure.—*Gazette Hebdom.*, April 20, 1883.

MATERIA MEDICA AND THERAPEUTICS.

Physiological Effects of Cinchonidine.

MM. G. SÉE and BOCHÉFONTAINE have made a series of physiological experiments with a sample of cinchonidine, the purity of which was proved by Oeschner and Coninek.

Toxic Properties.—Frogs succumbed to gr. $\frac{1}{4}$ of sulphate of cinchonidine introduced subcutaneously; dogs to 3ij given in the same manner. Pigeons and rabbits were not so much affected.

Physiological Effects.—These were in accordance with those noted by Raffesie (1876), Weddell (1877), and Cerna (1879). They were similar to the effects of quinine and cinchonine, the convulsions and salivation of the last being more pronounced in the dog, just as the vomiting from cinchonidine is more noticeable in that animal. None of these agents produced convulsions in the frog, and they are frequently absent in rabbits and dogs, and are only produced by toxic doses; consequently none of them can be classed without restriction as convulsive agents, such as strychnia; their place is rather among the substances which depress the central nervous system after momentarily exciting the circulation. It may be remarked that on man, in the normal state (the experiments being made on one of the authors of the memoir), sulphate of cinchonidine produces acceleration of pulse, increased surface heat, etc.; that is to say, a collection of symptoms which is ordinarily combated therapeutically by sulphate of quinine.—*Gazette Hebdom.*, April 20, 1883.

Physiological Action of Veratrine.

MM. PECHOLIER and REDIER, after a series of experiments on frogs, rabbits, and dogs, draw the following conclusions as to the action of veratrine:—

1. *Local action.*—It has a topical irritating effect on the skin and mucous membranes, which is augmented when the derma is removed. 2. *Digestive*

tract.—Veratrine is a powerful emeto-cathartic, producing abundant vomiting and copious stools. 3. *Secretions.*—Hypersecretion of nasal mucus, sialorrhœa, moderate diuresis, diaphoresis rarely. 4. *Circulation.*—(1) Primitive acceleration due in great part to the vomiting. (2) Secondary slowing of the heart's action, which may terminate in collapse. Heart stops in diastole. Alteration of the blood. In the frog, arrest of the lymphatic hearts before the blood-heart. 5. *Action on respiration.*—(1) Primitive acceleration. (2) Secondary slowing: painful and difficult respiration. 6. *Temperature.*—Lowering clearly determined by the thermometer. 7. *Muscular system.*—(1) Primitive excitation more or less short, according to the intensity of the dose, with apparant contractions. (2) Subsequent weakening and paralysis. Clear antagonism by strychnine, in spite of the opposite opinions of many authors. (3) Complete paresis and collapse. 8. *Nervous system.*—(1) Nervous motility not affected; the primitive excitability of the muscular tissue is determined by the contact of the veratrinized blood on the muscular fibre and not by the action of the motor nerve affected by the veratrine. This substance, Kölliker to the contrary notwithstanding, has no direct action on the cord. (2) *Sensibility;* to the irritating topical action, already mentioned, succeeds anæsthesia and analgesia. The intellectual functions are not impaired.—*Gaz. Hebdom.*, April 27, 1883.

Eucalyptus Steam in Infectious Diseases

MR. J. MURRAY GIBBES, of New Plymouth, N. Z., has presented an interesting note of his experience with this treatment, which consists in keeping the patient in an atmosphere of blue-gum (*Eucalyptus globulus*) steam. It is an acknowledged fact that in blue-gum we have a most perfect disinfectant; not an artificial one, but one of nature's own; one always at hand, for it will grow in temperate climates. The green leaves hung in a bedroom keep it sweet; leaves placed on a wound, steam inhaled from it, or its infusion drunk, or injected into wounds, all answer equally well. Professor Lister speaks highly of the eucalyptus oil for wounds, and it is also spoken highly of in rheumatism. It has not an unpleasant smell, and is tolerated by nearly all. By infectious diseases, he means those which are caused by micro-organisms.

His experience with this disinfected steam was in an epidemic of diphtheria near New Plymouth in October, 1882. Thirty-seven cases in which the treatment was carried out recovered without a bad symptom, such as paralysis, without any medicine except castor-oil, and without stimulants, which disproves the statement that diphtheria requires a large quantity of alcohol. The disinfectant he used was made by pouring boiling water on blue-gum leaves. The patients were kept in the moist atmosphere for some days. He mopped the throat with dilute solution of perchloride of iron and glycerine every eight hours, and then covered the pharynx with powdered sulphur. This was done in most cases, but the others recovered equally well. Two young ladies, aged seventeen and nineteen, coughed up complete casts of the large bronchi. An old lady, after he had mopped her throat once, refused to have it done; she had a very dense patch behind and on the right tonsil, the glands of her neck were very swollen and tender, the neck enlarged, and the breath was most offensive. On the third day half of the membrane had come away in small pieces, like grains of rice, the breath was sweet, and the swelling of the neck had nearly disappeared, and she made a perfect recovery. The epidemic was an unusually severe one, judged by the number of deaths of those who were treated by other means. The last cases which occurred took place in two families closely allied, five children and their nurse being attacked. He attended two of the children (the first and last attacked)

and the nurse. They recovered, whilst the other three, who were attended by a colleague, died. Local remedies are very good, but they are only a part of the treatment. We cannot perpetually keep spray applied to the throat, the children moving about from side to side of the bed. We must take the cure to them, and we can only do this by means of steam. His mode of procedure is very simple. He pours boiling water on blue-gum leaves, in a tub, jug, or chamber, which he places beside the bed, and changes it every half hour. If only one child is ill in the room he improvises a tent over the bed, either by means of an open umbrella with a sheet above it, or by placing a sheet over the sides or ends of the bed, and incloses the patient. It is wonderful to see how soon the pain in the throat and the swelling disappear, and the fever also.

At first he used a simple fever mixture; but he found it was not needed, as the skin acted more or less according to the amount of steam used. The patients were able to eat bread and butter, the throat not being sore because he had not burnt it. In diphtheria the throat is never very sore unless caustics are applied. In simple cases of it many remedies will answer; but if it once gets to the larynx and below it no remedy can touch it except steam. The laryngoscope showed patches on the vocal cords, and the breathing that it had extended lower; and in some cases where suffocation seemed imminent the distressing symptoms would be suddenly relieved by the membrane being conghed up.

Although blue-gum steam has answered so well with him, it is not the remedy alone that he wishes to bring before the profession, but the principle of the treatment, feeling sure that when a thorough trial has been given to it no other treatment would be found to give such satisfactory results; and if it answers in diphtheria it would answer equally well in other infectious diseases. In typhoid fever the heat would be lessened, the skin kept moist, and the bowels would not have to do double duty. In pertussis it would allay the irritation of the bronchial mucous membrane in the same way that it does in bronchitis, croup, and asthma. In scarlatina the congestion of the pharynx and the skin would be relieved. In so-called laryngeal phthisis it has given most satisfactory results. In influenza the infusion of *Eucalyptus globulus* is a very popular remedy, and it is one of the most infectious diseases. If blue-gum steam were adopted as a disinfectant, or any other drug, in the ward of a hospital, he recommends a boiler outside, with pipes leading into the ward along the floor, with small holes in them to allow the steam to pass through, and have a stopcock at the commencement to regulate the amount of steam. A pipe could also be placed along the wall, with mouth-pieces attached, for those patients who suffered from throat affections. The boiler could be placed in a sand-bath, so as to regulate the heat of the water, or a gas-stove used. The leaves could be placed in a net in the water, and changed as often as required. The advantages of the blue-gum steam treatment are that it can be used by ordinary attendants; in fact, a farmer at Tikorangi treated seven cases and cured them. In one of these cases, the membrane returned again and again for three weeks. He trusted entirely to the blue-gum steam. No internal remedies are required.

The method of employing eucalyptus leaves is inapplicable where they cannot be obtained fresh in any quantity. The difficulty can, however, be effectually surmounted by saturating the air with the vapour of eucalyptol, as is done by the machine invented by Mr. A. W. Mayo Robson and described in the *Brit. Med. Journal* for September 2, 1882. The nurse, or other attendant, is directed to work the bellows for a few minutes, at occasional intervals, so as to keep the air of the room odorous of eucalyptol. By converting the air of the sick chamber into a pure and antiseptic atmosphere, it refreshes and soothes the patient; and in rooms occupied by consumptive cases the antiseptic treatment may be effectually

carried out without muzzling the invalid by a respirator. In bedrooms occupied by fever or other infectious cases, the eucalyptus air is not only advantageous to the patient, but salutary to the attendants, since it effects more than is accomplished by the usual disinfectants, by attacking the germs of disease as they are diffused in the air.—*Lancet*, Feb. 24, and Mar. 31, 1883.

Therapeutic Use of Nitro-glycerine.

Dr. HENRI HUCHARD discusses the therapy of nitro-glycerine in a paper, from which the following general conclusions may be drawn:—

Nitro-glycerine is a vaso-motor paralyzer, and as such may be of service in:
1. Diseases of the heart, and especially those of the aorta, in which cases it combats the symptoms of cerebral anæmia, as Dujardin-Beaumetz has shown to be the case with nitrite of amyl. In these affections the danger is not so much from the heart as from the brain. Nitro-glycerine may be advantageously administered in cases of aortic affections with predominance of cerebral ischæmia. In cardiac affections characterized by a feeble state of the myocardium, amyl nitrite has been regarded as a cardiac stimulant, and nitro-glycerine has, doubtless, the same action. Nitro-glycerine has been especially productive of good results in angina pectoris, in doses of three drops a day of a solution of 1-100. It has also been successfully used in patients having a tendency to syncope, palpitations, etc., but only in those cases in which there is a nervous or anæmic state.

In nervous affections with cerebral anæmia, and in vascular neuroses, such as migraine, angiotonic migraine especially, non-congestive facial neuralgia, notably in that of anæmia, and in cephalalgia of the same order, nitro-glycerine has given excellent results. Hammond and Green have recommended its use in convulsive affections, as epilepsy and puerperal convulsions. It has been used with some success in cases of neurasthenia and in those of functional cerebral ischæmia, and would seem to be of service in certain cases of mental alienation. Schraun has used nitrite of amyl advantageously in cases of melancholia.

Since nitro-glycerine is a dilator of the peripheral vessels, it may be recommended in local syncope or asphyxia of the extremities, often occurring in hysterical subjects. In anæmic vertigo and Ménière's disease it has given excellent results. Since it determines polyuria and diminished arterial tension, it would seem to be indicated in chronic and interstitial nephritis, and Robeson has reported two cases in which it produced free diuresis, with diminution of the albumen, though Huchard has not had the same good results. The formula used by him is: distilled water, f $\frac{3}{4}$ x; solution of nitro-glycerine, 1-100 gtt. xxx; dose, three teaspoonfuls a day, one after each meal. It is clearly contraindicated in all cases in which there is a tendency to congestion, especially to cerebral congestion.—*Bulletin Gén. de Thérap.*, April, 1883.

Subcutaneous Injections of Stimulants.

Dr. W. ZUELZEN has used stimulants subcutaneously for some years, having published a paper on the subject in 1871 in *Berliner Klin. Wochens.*, No. 81. Those which have come into use since that time are ether, camphorated oil (1 in 10); camphor and benzoic acid (camphor 1 part, benzoic acid 1 $\frac{1}{2}$, rectified spirit 12); ethereal solution of camphor (sulphuric ether saturated with camphor); liquor ammoniæ anisatus; valerianate and some other preparations of ammonia; spirit of sulphuric ether; tincture of musk (1 part of musk to 25 each of water and dilute spirit); cognac, and several ethereal oils.

None of the remedies employed have caused any bad general effects, and their

action on respiration and circulation has been nearly alike in all—viz., immediate strengthening of both; but as they have generally to be repeated several times within a short space of time, it is important to avoid those which are irritating—*e. g.*, the preparations of ammonia, and still more alcohol, which easily produces sloughing of the skin. Camphorated oil causes the least pain, but is inconvenient on account of the small quantity of camphor held in solution—a large quantity of oil having the effect of retarding the respiration. Caffeine is useful where small doses only are required, on account of it being sparingly soluble (1 in 80). It may be injected into the arm of the affected side in migraine. Large doses cause irregularity of the heart's action, dizziness and faintness in healthy individuals. Ether and the ethereal solution of camphor have the disadvantage of partially dissolving the shellac with which the end of the hypodermic syringe is fixed to the cylinder. The author has therefore had a special syringe made for him by Goldsmidt of Berlin, of which the entire upper part is of glass; the cylinder ending in a glass cone, well ground in order to afford a proper hold for the needle. The pestle is of leather, firmly bound round with yarn, and graduated for the measurement of small quantities. The whole syringe is larger than usual, and will contain 4 to 5 centimetres (68 to 85 minims) of ether. Both ether and the ethereal solution of camphor can be employed freely, as no undesirable results have been known to follow their use even in large doses; partly, no doubt, because they immediately pass off by the breath. The pain after their injection is not great, lasts sometimes for several hours, and leaves behind it some numbness of the part. One cubic centimetre (17 minims) of pure ether may be injected into each of the four extremities at one time, and may be repeated in fifteen minutes at first, afterward at longer intervals.

The most important indication for the use of these remedies is collapse, when the patient is unable to swallow, or where a more rapid result is desired than by the stomach. The author has employed them most often in enteric fever and in cholera. When, in typhoid fever, there are great cardiac debility, small and irregular pulse, cyanosis, and coldness of the extremities, with deep collapse, the injection renders the pulse fuller and stronger within a few minutes; the cardiac contractions become more energetic, and the cyanosis disappears after one or two injections. Where the urine has been suppressed, diuresis follows their use, and Lindwurm states that the vomiting of enteric fever is arrested, a fact which the author has observed in Asiatic cholera. Leube, in Ziemssen's *Handbuch*, recommends their use in the dangerous swooning after gastric and intestinal hemorrhage, where there is the advantage of introducing the remedy into the system without involving the affected organ. Jürgensen, in the same publication, recommends camphorated oil in pneumonia, when weakness of the heart supervenes; and ether has been found of great service in œdema of the lungs in the same disease. Gellé relates a case of convulsions, coma, and vomiting, in a child of 7½ months, where, after the injection into each thigh of 10 minims of ether, the symptoms disappeared, and the pneumonia of which they were the prodromata, although severe, was recovered from.

The subcutaneous use of stimulants in midwifery also is extending. Bayr describes nine cases in Hecker's clinic, seven of acute anemia, one of shock after a difficult labour, and one of unfavourable anesthesia, treated in this way. Five improved suddenly, the others gradually. Von Hecker has injected as much as 10 grammes (2½ drachms) without either local or general disturbance, and he considers that the temporary irritation caused by the ether is especially beneficial in anæmic individuals. Winekel uses alternately ether and amorphous hydrochlorate of quinia, each three or four times in one day. After quoting a case given by Macan Dr. Zuelzer goes on to recommend the treatment specially in de-

liveries under chloroform, and in hemorrhages, either *post partum* or from placenta prævia, as employed by Chantrenil.

Liquor ammoniæ anisatus has been injected in a case of morphia-poisoning related by Leviustein; and ether injections proved serviceable in collapse following a suicidal dose of chloral-hydrate, 10 grammes (154½ grains). Finally, subcutaneous injection of ether has been employed with success in dropsy from fatty heart, where it increases, at least temporarily, the renal secretion.—*Lond. Med. Record*, May 15, 1883; from *Deutsche Medicin. Wochens.*, Feb. 28, 1883.

Bismuth Treatment of Wounds.

The use of bismuth in antiseptic surgery has yielded good results in Germany, especially in the hands of KOCHER, of Bern, who has used it more extensively than any other surgeon. From experiments made by Schuler, Kocher's student, he concluded that the antiseptic qualities of bismuth were due to its preventing the development of micro-organisms of putrefaction, and Kocher has shown that, in the treatment of wounds, less depends upon disinfection—annihilation of micro-organisms, than upon antiseptis—preventing the development of the bacteria.

In view of the ill effects sometimes following its use, it is better not to apply the bismuth in the form of powder in unlimited quantities. One per cent. of bismuth suspended in water has fulfilled all the requirements of thorough antiseptis. Owing to the insolubility of bismuth, it should be most thoroughly triturated in water in order that no grittiness should be present, and the emulsion thus formed should be shaken until the salt is equally diffused throughout the fluid before using. Kocher applies it in the following manner: From an ordinary squirting bottle the wound surface is moistened at intervals in the course of an operation, so that the loose cellular tissues in particular are covered by a thin film of bismuth; at each dressing this procedure is repeated, but when the edges of the wound have been brought into apposition, bismuth, made into a thick paste, is spread up on the line of suture and allowed to dry into a crust. This method has been followed by the happiest results. The dressings of Kocher then consist of (1) strips of absorptive material covered by (2) a layer of gauze—both of these having been dipped in a ten per cent. solution of bismuth, and the moisture thoroughly wrung out before application—and over these is laid (3) a piece of India rubber cloth, (4) cotton wadding, and (5) a dry roller bandage finishes the dressing.

Having in view the fact that, with favourable external surroundings, the open treatment of wounds is not inferior to the antiseptic method, he adopted a plan which he calls the "secondary suture" in which he claims to have retained all the advantages of the open treatment without interfering with the success of antiseptic methods. In all cases where it did not seem advisable to rapidly complete the dressing, as after a prolonged operation or because of the exhausted condition of the patient, the sutures were not tied, but bismuth was applied in various ways. If hemorrhage was present, bismuth-gauze was introduced into the wound; when, however, hemorrhage had ceased, the bismuth dressing was applied only to the surface, the edges of the wound having been brought into contact. After twenty-four or even twelve hours, but when secondary hemorrhage had supervened, after thirty-six or forty-eight hours, the wound was finally closed by the sutures, no opening being allowed to remain. For this "secondary suture," catgut can be used because of its weakness, and strong silk thread should be provided, since, because of the plastic swelling of the lips of the wound, some force is required to bring them into apposition—especially when the wound has been permitted to gape. The secondary suture was employed in a number of opera-

tions of widely varying character and situation. and, as a result of this experience, Kocher asserts boldly that the formation of wound secretion after twelve to twenty-four hours is not a necessary consequence of simple traumatism.

Bismuth possesses, to an eminent degree, the property of reducing the amount of wound secretions; it has long been successfully used as an astringent in case of abnormal secretions of the intestinal canal. In its desiccating and astringent qualities are found a considerable part of its value. It is, therefore, of double value in the treatment of wounds in that (1) it secures perfect asepsis of the surface, and (2) it limits secretions in the cavity of the wound.

To obtain the advantage which bismuth offers for securing union by first intention, certain other points must receive attention. The collection of a quantity of blood in the cavity of the wound must be prevented. This may be obtained by the forepressure forceps of Pean, Billroth, or by Kocher's modification of the latter. The advantages of these forceps consist in the fact that they grasp firmly when applied, take up a limited amount of space, and are absolutely aseptic. Hemorrhage, therefore, can be promptly controlled. Since extravasation from blood and lymph vessels cannot be absolutely prevented by ligature, a uniform compression of the edges and surface of the wound throughout its whole extent is necessary.

In cases where the great irregularity of the wound cavity and the surrounding conditions did not admit of the application of sufficient pressure, the secondary suture was substituted.

In Kocher's experience with bismuth, usually within twenty-four hours, but varying from twelve to thirty-six hours, secretion from the cavity of the wound ceased. Small superficial granulations along the lines of sutures sometimes delayed healing for days; these are simply treated by the application of bismuth paste, when healing by scab will ensue.

With the rapid healing of wounds following the use of these methods, care must be taken against too early exertions upon the part of patients, subjecting them to the possible detachment of emboli, from imperfectly organized thrombi in the severed vessels. Experience shows that there is particular danger of this in wounds of the neck and other parts where the ligature of a large vein may have been necessary.

The perfect asepsis secured by bismuth is the chief point in its favour. For instance, in a case of knee-joint disease with fungous degeneration, where the joint was opened and the diseased tissue removed, then dressed with bismuth and the secondary suture, without the use of drainage-tubes, rapid and uncomplicated recovery ensued.

Another advantage of bismuth, if used according to this method, is the entire absence of direct systemic effects. The great simplicity of the method, and the absence of cumbersome details and apparatus, is of great advantage to the surgeon. The convenience and freedom from annoyance to the patient as well is greatly in its favour. The application of the salt upon a fresh wound surface causes, momentarily, a smart burning sensation. On the second day, when the secondary suture is applied, the patient no longer complains when the bismuth irrigation is used.

As an antiseptic, bismuth is of greater use than iodoform on account of its insolubility. If it is desired to disinfect hands or instruments, or if an infected wound and the integument surrounding it must be disinfected, *i. e.*, if pathogenic organisms, which have found entrance to the wound, are to be destroyed, soluble antiseptics, like carbolic acid or corrosive sublimate, should be used.—*Annals of Anatomy and Surgery*, June, 1883.

Bismuth Treatment of Wounds.

Dr. RIEDEL, of Aix, read a paper before the Twelfth Congress of the German Surgical Association on the bismuth treatment of wounds in the hospital at Aix-la-Chapelle, during January, February, and March, 1883. His results with this treatment corresponded very nearly with those of Kocher. He had been careful to follow the directions of the latter, except that he omitted the secondary suture, but had used the primary suture and drainage. The bismuth dressing had given good results both in fresh wounds and operations and in those in which suppuration had occurred. Though he thought that bismuth was a good antiseptic, yet it was not an unfailing one. In sixty-one cases in which it was used there were four phlegmons and eight cases of erysipelas. Even with a combination of bismuth and corrosive sublimate there was one case of erysipelas in a patient who had a putrid compound fracture of the humerus. The beneficial results of the bismuth seemed to be due to its dryness and its power of suppressing secretions. He had seen no symptoms of poisoning from the use of it.

In the discussion on this paper, KOCHER said that a continued use of bismuth had increased his confidence in it as a dressing, and he thought that it promoted union by first intention. Dr. von LANGENBECK had had but little experience in this treatment since leaving Berlin. When he used it he had closed the wound immediately and inserted a drainage-tube, which he removed by the end of the second day. He would fear to fill a cavity with bismuth for fear of poisoning. As compared with iodoform it had the disadvantage of never forming a scab. He referred to a case in which he had extirpated an angioma from the inner side of the thigh. The resulting wound was a large hole, the walls formed of muscles which moved with every change in the position of the body, and which seemed very unfavourable for union by first intention. The wound was sprinkled with water in which bismuth was suspended, a drainage-tube was put in, the edges nicely brought together, and the whole covered with a bismuth compress. The drainage-tube was removed on the second day, and the wound healed by first intention. Dr. ISRAEL had used bismuth after extirpation of a carcinomatous breast and regretted it. Though the wound healed in ten days, gangrenous stomatitis was developed, which lasted for eight weeks. Lately the patient had come back to be treated for numerous nodules about the size of a cherry in the vicinity of the cicatrix. Incisions showed them to be small collections of bismuth.—*Deutsche Med. Woch.*, Nos. 16 and 17, 1883.

 MEDICINE.
Erythematous Eruption in Enteric Fever.

At the meeting of the Clinical Society of London on April 13, 1883, Dr. WHIPHAM related the particulars of two cases lately under his care in St. George's Hospital, in which an eruption resembling that of scarlatina occurred. The first was in a cabman, aged thirty-six, who had been addicted to drink, but who for twelve months previously to his admission had been a teetotaler. The fever symptoms had commenced fourteen days before, but the bowels had been regular and the motions natural. On admission the man complained of sore throat and headache, and had a bright erythematous eruption on the trunk, legs, and arms. The right tonsil was much swollen. His tongue was thickly coated,

his pulse 128, and his temperature nearly 105° . Next day the eruption was more marked on the arms and legs, and had extended to the feet. On the third day after admission the patient became very restless and delirious, and the bowels, which had been up to this date obstinately constipated, were opened freely by a purge. The diarrhœa thus set up, though somewhat moderated towards the last, continued more or less up to the time of the man's death, *i.e.*, four days after his admission. No typhoid eruption was present. At the autopsy extensive ulceration of Peyer's patches was found. The second case was that of a child, aged four, who was received into hospital on October 6, 1882. He had already suffered from scarlatina, measles, and whooping-cough. Feverish symptoms manifested themselves on the day before his admission, and when he came under observation his temperature was 104.2° , pulse 120. His tongue was red at the tip and edges, and the papillæ protruded from a central white coat. On the day after his admission a red eruption was noticed on the child's legs, and he was therefore isolated. Next day the erythema had greatly extended, and was very brilliant. The tonsils were red and swollen. The bowels were constipated. On October 10 (four days after admission) the eruption had faded considerably. The bowels remained inactive, and a purge of Carlsbad salt was administered, which acted freely. On the 11th the red eruption had disappeared. On the 13th the temperature reached 105° , and the pulse 132. The child was delirious and had fits of screaming. The bowels acted once after castor oil, the motion being partly formed, and of a clay colour. On October 17 characteristic spots of enteric fever appeared, but there never was desquamation at any time. From this date the symptoms were clearly those of enteric fever, and the child died on the nineteenth day after admission. The post-mortem examination revealed extensive ulceration of Peyer's patches and great swelling of the mesenteric glands. Dr. John Harley, in *Medico-Chirurgical Transactions*, vol. lv., gives twenty-eight cases in which scarlatina was accompanied by swelling of Peyer's patches, but in only two of which ulceration was found, and also a second series of six cases in which scarlatina preceded enteric fever, and further narrates three cases of "mixed scarlet and enteric fever." He also quotes two similar cases recorded by M. Forget. Dr. Murchison says that in many cases of enteric fever the characteristic eruption is preceded by a delicate scarlet rash, and adds that "this is not peculiar to enteric fever, but occurs in other forms of pyrexia." Sir W. Jenner, speaking of a red rash in enteric fever, says that the disease was mistaken for scarlatina. Dr. Whipple had lately seen a case of variola which was preceded by erythema of the abdomen and thighs. The question is, Are these really cases of double poisoning, of mixed scarlet and enteric fevers? The absence of desquamation, and the fact that an erythematous eruption is not uncommon in variola, pyæmia, and other forms of pyrexia, led to the conclusion that they are really instances of enteric fever preceded by erythema, and not mixed cases of scarlatina and enteric fever.

Dr. ANDREW CLARK asked what explanation could be given of the increased rate of breathing, and what was the probable cause of death in the cases described.

Dr. MAHOMED said that he had seen roseolous eruptions precede several cases of typhoid fever. In the majority of these instances there was a subsequent desquamation of a trivial character. As an exception, however, he had met with a case of enteric fever in which the desquamation was almost as perfect and as free as in a typical instance of scarlet fever. He was in the habit of speaking of four rashes which occurred during the progress of typhoid fever—roseola, rose spots, *taches bleuâtres*, and miliaria. Similar red rashes had been observed to precede nearly all forms of specific fever. Their occurrence was well known in cholera and variola; they had been observed occasionally in typhus.

Dr. CAVAFY thought that rashes of an aspect quite similar to those of scarlatina possessed a very wide range of occurrence. There were the various rashes produced by drugs of different kinds, also those found in association with slight surgical fever, puerperal fever, menstruation. It must be regarded as probable that in all these instances there was some common bond of connection; this was probably an irritation of the nervous system either by direct traumatic influence or through the blood. In scarlatina he supposed there was paralysis of the vasomotor centre due to the action of the poison. In the traumatic eruptions there was immediate irritation of a peripheral nerve. He related an outline of a case that he had communicated to the Clinical Society, in which salicylate of soda seemed to have called forth a remarkable group of symptoms: sore-throat, scarlatiniform rash on thorax, circumscribed erythematous on backs of hands and extensor surfaces of forearms. The rash faded in a day, and the erythematous passed on to the formation of herpetic vesicles. Finally there was desquamation of the arms, indistinguishable from that occurring after scarlet fever. The ingestion of quinine has been known to be followed by the development of a scarlatiniform rash. Surveying the subject generally, it would, perhaps, be best to regard the matter as still in abeyance. At all events, he knew of no certain means by which to distinguish such erythematous from true scarlet-fever rash.

Dr. ANDREW CLARK quite agreed with Dr. Cavafy that the nervous system was operative in the production of the erythematous in question. On examination of the chest of nervous females a diffuse red injection was seen in about seven out of ten cases, especially when the observation was made in front of the window with plenty of light. He was in the habit of recording the various forms which this erythema assumed, and thought that an explanation must be sought in the temperaments and habits of the patients. He was familiar with the presence of the scarlatiniform rash appearing in the actual course of typhoid fever, and had, rightly or wrongly, attributed these to a special affection of the nervous system. He had seen them most frequently in anomalous cases in which the nervous system was specially involved.

Dr. BROADBENT was well acquainted with the delicate erythema which so frequently ran before typhoid fever, but he certainly would never confound this with a true scarlet-fever rash. When a well-marked scarlatiniform rash came out in any part of the course of enteric fever he always regarded it as evidence of a concurrence of the two separate diseases. He had seen all forms of combination between scarlatina and enteric fever. Dr. Mahomed had recited one case this evening, and he assuredly regarded Dr. Whipple's first case in the same light. He had lately shown at the Harveian Society a man of weak constitution with decided loss of tone, in whom an erythematous eruption, not at all unlike a syphilitic roseola, appeared every time the patient was stripped. There was in addition a marked *tache cérébrale*, and the muscular irritability was highly marked, each tap causing a well-developed local contraction.

Dr. ANDREW CLARK added that the erythema medicorum, or doctor's rash, of which he had spoken, sometimes lasted thirty-six hours.

Mr. HERBERT PAGE stated that Hebra had described the entaneous eruptions as preceding many acute specific diseases, and especially smallpox. Mr. Page had seen an acute papular eruption occupy a large surface of the body and fade away prior to the appearance of an abundant confluent rash on the face of a severe case of smallpox, in which the patient died about the ninth day. He also mentioned a somewhat similar antecedent which happened in one of his own children.

Dr. WHIPPLE, in reply, said that he had brought the cases forward rather with the view of eliciting the opinions of members as to what was the proper

course to be adopted. He thought Dr. Cavafy's suggestion to isolate the patient in a separation-ward was the right proceeding. He rather came to the conclusion that his second case was not scarlatina, because the brilliant red eruption had not been followed in nineteen days by desquamation. He had nothing to say against the view that scarlet fever and typhoid were frequently concurrent, as Dr. Broadbent held.—*Medical Times and Gazette*, April 21, 1883.

The Pythogenic Micrococcus of Erysipelas.

The direct proof of the pythogenic nature of the micrococci of erysipelas has been given by FEHLEISEN, who has not only found them present in all cases of erysipelas (13 cases) which he examined during life, but also cultivated them, and with equal success inoculated the cultivated organisms in animals and in man (*Die Aetiologie des Erysipels*, Berlin, 1883). In small portions of skin excised from the diseased part in patients suffering from erysipelas, Fehleisen found in all cases numerous micrococci arranged in chains. They were especially abundant in the most recently affected part; and here they were found most markedly in the superficial layer of the corium and in the subcutaneous adipose tissue, filling the lymphatics and the lymph-spaces, whilst the rest of the tissue showed cell-infiltration. Contrary to the older observers, they were never found in the blood-vessels. To prove that their presence was not merely accidental, Fehleisen cultivated some small excised pieces of skin on gelatine, after having carefully disinfected the affected part, and succeeded, in the course of two months, in producing fourteen generations. The cultivated micrococci formed a whitish film, easily detached from the surface of the gelatine, and consisted entirely of the specific micrococcus. Nine rabbits were now inoculated on the ear with the pure and cultivated micro-organisms. In one the effect was merely a slight elevation of temperature; in all the others, after thirty-six to forty-eight hours, the temperature rose, and a characteristic erysipelatous rash appeared, and gradually extended to the root of the ear, and thence spread to the head and neck. In the course of six to eight days the disease had run its course, and the animal recovered; not one of the animals died. The light red colour of the affected part, the absence of œdema or suppuration, and the presence of the micrococci in the lymphatics of the affected part (seen in one case, where the ear was amputated during the height of the disease), showed that the affection produced in the rabbit was true erysipelas, and not septicæmia.

More valuable still to show the etiological importance of the micrococci in erysipelas are Fehleisen's inoculations on man. Such a proceeding was perfectly justifiable when we consider that many of the older and distinguished surgeons (Ricord, Desprès, Hebra, Busch, etc.), have quoted cases showing the therapeutic and beneficial effect of erysipelas when occurring in cases of lupus, cancer, and other malignant tumours. Fehleisen inoculated the pure and cultivated micrococci in seven cases. Of these, the first was a case of multiple fibro-sarcomata; the second a case of cancer of the mamma, which had already been operated on three times, and showed now several large tumours, adherent to the skin; the third, a case of intraorbital sarcoma, which had reappeared and grew rapidly after enucleation of the eyeball for a primary intra-ocular sarcoma; of the remaining four, two were cases of cancer of the mamma, and two cases of extensive lupus of the face. Six out of the seven cases showed, after a period of incubation varying from fifteen to sixty hours, typical erysipelas, setting in with rigors, high temperature, and running the characteristic course. In some the symptoms were very severe; in the first there was threatening collapse, and the second was complicated with pleurisy, which, however, soon subsided. As

regards the therapeutic effect, the inoculations are of some interest: one case of lupus was almost completely cured (in the second case of lupus the inoculation did not produce any erysipelas); in the second case the cancerous tumours completely disappeared, and there has been no recurrence so far; in the case of the orbital sarcoma, and in the other two cases of cancer there was no marked effect produced; whilst in the first case the fibro-sarcomatous tumours at first diminished, but afterwards grew again in size.

As Fehleisen succeeded in successfully inoculating several cases twice after a period of a few months, it appears that, if there be an immunity against a second attack of erysipelas, that immunity is, in most cases, only of short duration.

Fehleisen also tried the effect of antiseptics on the vitality of the micrococci. This portion of the researches might well bear extension, for only two substances were experimented with, carbolic acid and corrosive sublimate; a 3 per cent. solution of the former stopped the growth of the micrococci after a contact of forty-five seconds, whilst the same effect was produced in fifteen seconds with a 1 per cent. solution of the corrosive sublimate. From an etiological and pathological point of view, Fehleisen's researches are of great importance, and the list of diseases due to a specific micro-organism is thus enriched by one. As for the practical outcome, further researches in different directions are needed; and it is with the hope of inducing some English observers to take up this subject that we have given to Fehleisen's observations the prominence which they justly deserve.—*British Medical Journal*, March 24, 1883.

The Differential Diagnosis of Uræmic Coma from the Coma of Cerebral Hemorrhage.

Dr. T. A. McBRIDE, in an article in the *American Journal of Neurology and Psychiatry*, gives the differential diagnosis between uræmic coma and coma due to cerebral hemorrhage. This is important, as statistics show that cerebral hemorrhage is a very common accident in the course of chronic Bright's disease, and also that the hemorrhage is usually of large extent, and the accompanying coma very pronounced. From a therapeutic point of view the distinction is very important.

1. The temperature should always be taken in the rectum, with a self-registering thermometer. In chronic Bright's, and in the aged the temperature in the axilla is often a degree or more lower than in the rectum. Charcot called attention to the fact that in cerebral hemorrhage at its beginning there was a fall of cerebral temperature below 99° . This might be present from one to ten hours or more, and until death in the fulminating form. This period of depression may be followed by a continued and uninterrupted rise of temperature to 105° or 108° . A high temperature occurring shortly after the advent of coma, should have weight in ascribing the coma to uræmia.

2. Evidence of interference with the functions of the brain from some gross lesion, i. e. cerebral hemorrhage producing hemiplegia. Hemiplegia is common in cerebral hemorrhages of large extent, and the hemorrhages of chronic Bright's are, as a rule, large. The signs indicating the presence of hemiplegia due to lesion of one of the hemispheres are: (a) Conjugate deviation of the eyes and rotation of the head away from the paralyzed side and toward the hemisphere which is the seat of disease, usually occurs as a temporary symptom in all cases of cerebral hemorrhage. (b) Facial paralysis (cerebral). This may not be detected unless the coma be not great, and passing off. (c) The limp condition of the upper and lower extremities, but this sign is uncertain and not to be depended on. (d) Exaggerations of the deep or tendon-reflexes on the hemiplegic side. (e) Ab-

lition of the superficial reflexes on the hemiplegic side, and their existence on the sound side. (f) Increased temperature of the extremities of the hemiplegic side, amounting to one or two degrees Fahr. (g) Erythema of the centre of the gluteal regions. According to Chareot this usually shows itself from the second to the fourth day after the seizure, rarely sooner and sometimes later. An eschar forms very quickly in the site of the erythema. (h) The symptoms and signs of uræmia; high temperature, suppression of urine, a scant and bloody urine, accentuation of second aortic sound, and a pulse of very high tension, œdema of lungs, marked subconjunctival œdema, general anasarca, etc.—*Amer. Journ. Neurol. and Psychiat.*, February, 1883.

Hemorrhage of the Nerve Centres in the Course of Purpura Hæmorrhagica.

Dr. DUPLAIX, after a study of 24 cases, draws the following conclusions: 1. There exist in the course of purpura hæmorrhagica certain cerebral troubles of great frequency, which depend upon certain cerebral lesions. 2. The cerebral manifestations of purpura hæmorrhagica are very variable in intensity, sometimes but little marked and passing off unnoticed; again very violent, and causing the death of the patient. 3. Their cause lies in some modification of the state of the nerve centres—most frequently they are due to cerebral anæmia, though in certain cases to hemorrhage. 4. As a rule these hemorrhages are but little marked, though numerous, occupying sometimes the meninges, at others the cerebral substance, and often both at the same time. 5. There may be true hemorrhagic foci without a definite seat, whose consequences are those of ordinary cerebral hemorrhage. 6. The hemorrhages are rare, on account of the profound cerebral anæmia existing in most of these cases. 7. Their pathogeny does not differ from those of other organs, but the condition of the circulation and the vascular alterations must be noted, which have been marked especially in the cases in which grave results have been delayed in debilitated patients. 8. The clinical manifestations are very variable, and in proportion to the extent and intensity of the lesions; there are, however, cases in which, in spite of the lesions, there have been no symptoms during life, and others in which anæmia only has been observed, although the cases presented marked symptoms. 9. The diagnosis of these cases is, as a rule, difficult. Hemorrhage should always be suspected, in spite of the greater frequency of anæmia. The prognosis depends on the intensity of the nervous troubles.—*Archives Gén. de Méd.*, May, 1883.

A Case of Tachetic Symmetrical Gangrene.

At a late meeting of the Clinical Society of London, Dr. SOUTHEY read the following particulars of this case:—

Frank Nash, aged 9 (admitted into Matthew Ward, St. Bartholomew's Hospital, November 25, 1881), was much emaciated, his hair thin and falling off, abdomen empty and retracted, skin dry; and he was in a curious, excitable, semi-delirious mental state. He presented a gangrene of the tip of his right index finger, all his extremities felt cold, and he had insomnia. His pulse was 148, very feeble. Respirations 32. Temperature 99°. His heart beat with feeble impulse, in the normal situation. There was no increase of normal cardiac dullness; no cardiac murmur; no physical sign of lung disease. Neither liver nor spleen transcended their normal limits. His appetite was bad; he had had no sickness; the bowels acted once daily; the tongue was clear and moist; micturition gave no pain; the urine was scanty, not abnormal, chiefly passed with his stools.

Course and Progress.—After a few days the thumb and second finger of the same (right) hand were similarly involved, became first red and throbbled, then livid, and finally gangrened. On December 5th, an exactly similar spot occurred on the pinna of the right ear, and on the extremity of his nose, and the tip of the middle finger of his right hand. A little later, subcutaneous mottlings (*tachetées*) appeared all over his trunk and limbs, and developed into a raised rash, like *urticaria tuberosa*, or *erythema-tuberculatum*. The spots first itched, then became painful and tender, but gradually subsided, leaving only some pigmentation to mark their sites. Finally, all the fingers and thumb of the right hand gangrened and slowly separated, and the thumb, index, and little finger of the left hand. He passed into a condition of most extreme prostration, with broncho-pneumonia of both lungs, and only very slowly and gradually recovered from it. In January, 1882, a new and interesting clinical feature was manifested, namely, intermittent true hæmaturia, bloody urine being passed alternately with normal-coloured non-albuminous urine. Some days distinct blood-cells were passed with the urine; on others, blood colouring matter without blood-cells; on others, albumen with blood enough to give the blood reaction only. Oxalate crystals were present in great abundance when the hæmaturia was abundant, and *vice versa*. No tube casts were ever noticed. All symptoms of urinary disorder disappeared in July, 1882, when the child was discharged well, but with the loss of his fingers.

Dr. ANDREW CLARK asked if any history of rheumatic gout could be traced in this case? He was familiar with such forms of gangrene in this connection.

Dr. SOUTHEY said he knew of nothing in the history to justify him in an affirmative reply, and referred to the account of a very similar case to his own, published in 1804, from the pen of a French physician, Reynaud.

Dr. BARLOW said he had never seen so severe a case of the disease as that described by Dr. Southey, but he had seen two or three which were less severe. As Dr. Southey had observed, the most important feature they presented was not the gangrene, but the vaso-motor disturbances. In one case, within his own experience—that of a man aged 35, who had been generally regarded as rheumatic—the attacks, which usually occurred during winter, were ushered in by pain in the lower extremities, which was followed by the appearance of bluish-red patches on the integuments. When first seen by Dr. Barlow, he had just suffered an attack, and there was a distinct patch on one trochanter, while one toe was the subject of local gangrene, and all his toes were blue. In two other cases observed, in female children, $3\frac{1}{2}$ years old, the attacks occurred between September and April, being rare in summer, and were in the latter case associated with sudden changes in temperature. In one child the lower limb affected was intensely painful and black from above the ankle to the toes when seen, and presented a most alarming appearance. It remained thus for about three hours, and then passed off, the child seeming quite well again. She had several attacks of the kind in the legs and forearms. The attacks occurred on cold days in the other case also, and on several occasions were accompanied with violent stomach-ache, while, two or three hours subsequently, dark-coloured urine, containing hæmatin, oxalate-crystals, and albumen, would be passed, but only once after each attack. Dr. Barlow considered that the disease presented many points in common with that known as paroxysmal hæmaturia. It was a disease of winter, and was usually preceded by a condition of sleepiness; its resemblance to ague-attacks was not well marked, for there was no sweating stage observable, the cold stage being the principal one. He had elicited from the mother of the patient presenting typical paroxysmal hæmaturia that the child's finger-ends grew distinctly blue during the attack, and, so familiar was the appearance, that no especial heed was paid to it. Dr. Barlow thought that the application of cold

was a more rational treatment than the employment of warmth, being led to this opinion from his knowledge of the effects produced by cold in the treatment of frost-bites. He mentioned the case of a child which—a sufferer from paroxysmal hæmaturia, and accustomed to be washed in warm water—was submitted to the influence of cold water, with good results. The constant current applied down the back had been employed by Reynaud, with a view to diminish the irritability of the vaso-motor centres, and with success. A patient of his own had described how this treatment was the only one which had done him much good while in St. Bartholomew's Hospital, and the method was certainly worthy of extended trial. There was no confirmation forthcoming of the association of rheumatic gout with the disease in his cases. Mr. Hutchinson, however, had described a connection between end-joint arthritis and Reynaud's disease, and a patient under his (Dr. Barlow's) care might be taken to confirm this opinion.

Mr. CRIPPS took exception to the definition of Dr. Southey when calling the affection a "blood" disease. He, himself, regarded it as an essentially local complaint, and the gangrene as its principal feature. Such cases were analogous to frost-bite, to the production of which no special bodily condition was necessary, but simply exposure. Children who were attacked by symmetrical gangrene would be bound to have suffered from chilblains, which were an indication of enfeebled circulation dependent on a weak heart. He cited the case of a young woman who had been affected with chilblains, when living in reduced circumstances. She gave birth to a child, after which event she developed symmetrical gangrene, with the result that she lost both lower extremities. He did not agree that it was right to apply cold or evaporating lotions to gangrened limbs. Brodie's treatment, by wrapping the limb in cotton-wool and keeping it covered, was wiser. Opium was the most reliable drug to employ; given freely in small but divided doses.

Dr. BARLOW pointed out that he had not recommended the application of cold in the treatment of gangrene, but in these cases of local asphyxia.

Dr. MAHOMED had seen two cases similar to that mentioned by Dr. Southey. In one intermittent hæmaturia had existed, and crystals of oxalates were found in the urine. He explained that this frequent association of intermittent hæmaturia with symmetrical gangrene effectually separated such cases from those dwelt on by Mr. Cripps; and, moreover, the patients in the former cases were not necessarily endowed with a feeble circulatory apparatus. A few male patients of his own had suffered from the disease in a more or less chronic form for seven or eight years. The fingers presented a gangrenous appearance, which varied with the weather, but was not improved by treatment. The tips of two or three fingers had been quite lost. In summer time the hand was quite useful.

Mr. SYMONDS referred to several cases within his own experience, which possessed features in resemblance with those previously discussed; they had lost the tips of ears and fingers, and were now quite well.

Dr. SOUTHEY accepted Mr. Cripps's correction of the term "blood-disease," and substituted for it the description of a general disease, with local manifestation. Reynaud's account of it as being a vaso-motor disturbance was probably accurate, but the etiology was very obscure. As a rule, local asphyxia was the final stage arrived at as the result of the disease, the tendency to go on to gangrene being unusual. In one case, that of a woman, three fingers were seen, on two separate occasions, to become quite purple, and, even during observation, colour and sensibility were restored.—*British Med. Journal*, May 5, 1883.

A Case of Tabetic Arthropathy in which the Tarsal Bones of both Feet were involved.

At the meeting of the Clinical Society of London, held on April 13th, Mr. HERBERT PAGE read the following interesting account: This case was originally shown in the museum for living specimens at the International Medical Congress. The patient was a man aged thirty, who, in October, 1880, began to have swelling of his right leg and ankle. The foot gradually increased in size, and when first seen in February, 1881, there was great enlargement in the region of the tarsal bones, which were freely movable on one another in any direction. A month later broken corns appeared on the sole, with an ulcer on the big toe. These sores were absolutely painless, as, indeed, was manipulation of his foot—a circumstance which led to the discovery that the patient was the subject of *tabes dorsalis*, the knee-jerk being absent, and the pupils presenting the “Argyll-Robertson phenomenon.” There was no ataxia in gait. While under observation the left foot became affected in a similar way to the right, very rapidly and without pain. Four years previously he had severe lightning pains down the limbs, and two years before he had an illness called “nervous debility,” of which the most noticeable feature was profuse vomiting every day for nine months, which began and ended quite suddenly without known cause as to its origin or its termination—a true gastric crisis. Attacks of a similar kind have occurred since the patient has been under the author’s observation, and each of them has begun with severe rigor, and been marked by the passage of large quantities of blood in the urine, associated, at the same time, with profuse vomiting, diarrhœa, and increased lightning pains. The patient has now been free from these attacks for some months, and the swelling of the feet has subsided. The feet, however, are strangely deformed, owing to an alteration in the relative position of the affected bones. The other symptoms of *tabes dorsalis* remain the same, but there is still no ataxia. The history of this case having been given at considerable length, the author avoided speculation about it, expressing the belief that he should not do wrong to be content at present with the clinical study of the disease. He pointed out the rarity of this particular form of arthropathy, only one instance of which had been seen by M. Charcot. Though rare, it had, however, many features in common with the arthropathies affecting the larger joints. He laid stress on the practical importance of recognizing these diseases in the surgical wards of hospitals where they are most likely to be found, the common symptoms of ataxia being often absent, and therefore rendering the diagnosis more difficult. One foot of his own patient would in all probability have been removed—so bad was it—had not the cause of the affection been accidentally revealed by the symptoms. The arthropathy has subsided, however, and left a useful, though deformed, limb. The occurrence of attacks of paroxysmal hæmaturia was a striking feature in this case, and the association thereof with the other symptoms of a crisis seemed to indicate that it was not less a symptom of the disease than the vomiting, the diarrhœa, and the joint affections. The history may therefore suggest a new line of observation and inquiry in the study of these cases of paroxysmal hæmaturia or hæmatinuria, whose cause and origin are so often obscure.

Dr. ALTHAUS objected to the adjective “tabetic” on etymological grounds; it ought to be, he said, *tabic* or *tabedosis*.

Dr. BUZZARD thought the remarks of Mr. Page anent the attacks of paroxysmal hæmaturia or hæmatinuria of much import. He had met with no similar case. It was possible that cases of apparently simple paroxysmal hæmoglobinuria were really the only manifestations of *tabes dorsalis*. He had frequently

pointed out the remarkable association of the occurrence of the gastric symptoms and the arthropathies. This was illustrated by reference to the report of a recent case at one of the provincial medical societies. In this instance also there was evidence of a healed perforating ulcer of the foot. Quite recently he had met with an anomalous case in which the left big toe-nail had become the seat of an ecchymosis without any injury; this had caused the separation of the nail, and it turned out that precisely the same thing had happened last summer to the right big toe-nail.

Dr. MAHOMED related a case of locomotor ataxy, in which the earliest symptom was atrophy of the optic discs; there were characteristic pains, but no ataxia. In this patient there was marked polyuria, as much as 180 ozs. being passed per diem of a specific gravity of 1004. The polyuria was not permanent.

Mr. PAGE, in reply, quoted some facts from an American thesis, in which spontaneous loss of nails and peculiar change of the toe-nails had been observed in a number of cases. Regnaud had also described recurrent attacks of nephritic colic closely simulating the violent attacks usually met with in cases of renal calculi. Dr. Buzzard's suggestion that paroxysmal hæmaturia might really be due to tabes dorsalis in some instances was further borne out by Mr. Page's case, for the man had distinct attacks of shivering, which, had it not been for the collateral acts, might have been attributed, as usual, to "cold."—*Medical Times and Gazette*, April 21, 1883.

Primary Stenosis of the Œsophagus.

M. DÉBOVE, in a communication to the *Société Méd. des Hôpitaux*, gave an account of a case of stricture succeeding a simple ulcer of the œsophagus. A man, æt. 54, without carcinomatous history, entered Bicêtre in November, 1882. Had had soft chancre, and suppurating buboes in 1848, and several attacks of delirium tremens. In December, 1870, he noticed that the passage of food to the stomach produced sharp pain at the level of the xiphoid cartilage. In March, 1871, he had three hæmatemeses, vomiting a quantity of black blood. On going to a hospital an œsophageal sound was passed, after which deglutition was less painful. In 1871 and 1872 the hæmatemeses recurred, and again in 1878, at which time the pain returning the œsophagus was catheterized several times.

On examination at Bicêtre two strictures were found; one just above the cardiac orifice, the other narrower and scarcely allowing the passage of an olive-pointed sound of eight millimetres, at the level of the xiphoid cartilage. M. Débove thought that it was a case of œsophageal stenosis running back ten years and showing two distinct periods: The first prior to 1878, characterized by sharp pain in the passage of food, and by hæmatemeses; the second marked only by difficulty in swallowing solids, nutrition being easily carried on by fluids, particularly milk. The length of time during which the affection had lasted threw out the idea of a carcinomatous origin. The patient was not syphilitic, had never swallowed any caustic solid or liquid, had no history of traumatism, and M. Débove diagnosed stenosis of the œsophagus following simple ulcer; the first period of symptoms corresponded to the evolution of the ulcer, the second to the cicatricial contraction. Quinke, who has cited three analogous cases, thinks that gastric juice entering the œsophagus may be a cause of the affection. Débove thinks that alcoholism was the cause in his. He obtained excellent results from dilatation; the man after treatment was able to swallow solid food. Dilatation was commenced on November 12, with a No. 14 olive; on November 25 a No. 20 could be passed. After December 5th the patient himself passed a large caoutchouc sound, such as is used in artificial aliméntation. Since that time deglutition has been normal.—*Gaz. Hebdom.*, April 20, 1883.

Catarrhal Ulceration.

Prof. VIRCHOW does not agree with Niemeyer in saying that, in acute and chronic catarrh, ulceration or superficial erosion of the laryngeal mucous membrane of the larynx may occur, and that the inflamed mucous membrane is then in a condition analogous to the denuded cutaneous surface after the rupture or puncture of a blister from a blistering plaster. At the same time Niemeyer describes follicular ulceration. Virchow holds that from the mucous membrane in catarrh there is simply an excessive flow of its normal secretion, as may be seen in the nasal membranes. This secretion, flowing from an unimpaired surface, is the essential feature of catarrh, so much so that the phrase "dry" catarrh is meaningless to the author, a contradiction in terms. Catarrhal ulceration is equally unintelligible to Virchow. A child, he observes, may have an irritating discharge of mucus from the nostril, which may accumulate about the nostril and lip, and cause inflammation and ulceration thereof, but the ulceration being on the skin, and not on the mucous surface, cannot be correctly termed catarrhal. The ulceration of the larynx in phthisis is not catarrhal. The pavement epithelium which extends from the lips to the cardia, with the exception of a small spot at the border of the larynx, is not the seat of ulceration. Parts of the mucous tract that are lined with cylinder epithelium are not thus exempt from ulceration, as may be often seen in the intestines after persistent diarrhoea, and in other parts where glandular follicles exist. Virchow recognizes only as catarrhal the secretion flowing from a simple mucous surface, and repudiates the application of this epithet to any secretion from glandular structures.—*London Med. Record*, May 15, 1883; from *Berliner Klinische Wochens.*, Nos. 8 and 9, 1883.

Antiseptic Inhalations in Pulmonary Disease.

Dr. ARTHUR HILL HASSALL has recently been making some investigations (*Lancet*, May 5, 1883) into the comparative inutility of antiseptic inhalations as at present practised in phthisis and other diseases of the lungs.

It has appeared to him that the practice of such inhalations, which is now so much in vogue, has not been shown to rest on any true or scientific basis or foundation, and further that the clinical evidence in its favour is so far singularly weak, notwithstanding the publication of a number of cases affirmed to have been benefited thereby. Under these circumstances he has been led to institute a series of experiments and observations with a view to test the efficacy of antiseptic inhalation in the class of diseases mentioned, and he relates the results. The principal antiseptic substances used are phenol, commonly known as carbolic acid, employed much more frequently than all the others; and to which therefore the most importance is attached; creasote, which ranks next; thymol, now coming into more general use; and iodine. His experiments show that the volatility of phenol at ordinary temperatures is exceedingly slight; it increases, however, in proportion as the temperature is raised. The solution of phenol in alcohol and chloroform he finds to lessen instead of increasing the volatilization. He finds that it is extremely doubtful whether any portion of this antiseptic ever reaches the air-cells of the lungs. This doubt is greatly strengthened by the fact that the sputa in cases of phthisis brought up shortly after inhalation never, so far as my experience goes, smell of carbolic acid; neither has he ever found that acid present in them in any notable quantity. Another fact corroborative of this view may here be cited. The air expired during the inhalation of the carbolic acid was passed through distilled water which was afterwards tested for the acid, the faintest trace only being discovered.

The next antiseptic experimented with was creasote. No volumetric chemical process being known for the quantitative estimation of this compound, the gravimetric method had to be pursued, which, however, furnishes results sufficiently precise for the purpose. He finds that creasote is somewhat more volatile than phenol, but still is of very slight volatility.

Thymol, which is a powerful antiseptic, he finds to be not in the least volatile at ordinary temperatures, and that it is scarcely possible to conceive that it can, as at present employed, exert any beneficial effect by inhalation.

In iodine we really have a volatile agent to deal with, and hence it might be presumed that it did, in fact, make its way into the lungs. This conclusion, though apparently warranted by the disappearance of the antiseptic during inhalation, is not confirmed by further observation.

When testing the saliva and mucus of the mouth and throat on the completion of the inhalation with a solution of starch, he noticed that the colour of the starch was unchanged, proving the absence of free iodine. On applying, however, an acid to the mucus, the blue colour was abundantly developed, showing that very much of the iodine inhaled, and possibly the whole of it, had become converted into an iodide, in which transformation it loses entirely its antiseptic properties. This is an interesting and important fact, not only in relation to the subject now under consideration, but in other ways. Thus, for one thing, it shows how useless it is to administer free iodine as a medicine. Again, it should be known that when, as is frequently the case, carbolic acid and iodine are inhaled together, a strong chemical action is set up between them, whereby probably the antiseptic properties of both are impaired. In the case of iodine, then, evidence is also wanting to show that this antiseptic does really make its way into the lungs. Now it may be urged that if the inhalation of the several antiseptics had been continued for a longer period than an hour, the result would have been different—that is to say, that more of them would have been inhaled. In order to test this point, the inhalation of carbolic acid was continued for two hours in three experiments with the following results: Of the 500 milligrammes taken, they were recovered by Chandelon's process 410, 400, and 390 milligrammes respectively, thus showing only a very moderate increase, quite insufficient to affect in any material manner the general results arrived at. Even had the amount inhaled been much greater, it would by no means have followed that a proportionate increase of the antiseptic was to be found in the lungs. Supposing a small quantity of any of the antiseptics really reaches those organs, it is not to be supposed that it remains there for an indefinite time, and goes on accumulating as long as the inhalation is continued. The action of the absorbents would doubtless come into play, and the antiseptic which was inhaled the first hour would become removed by absorption during the second hour. Again, it might be urged that if smaller quantities of the antiseptics were placed in the inhaler, the proportionate volatilization would be greater. 250 milligrammes of phenol in water were sprinkled on the sponge of the inhaler, and inhalation continued for an hour, at the end of which time 234 milligrammes were recovered from the sponge, showing a smaller, and not a larger, proportionate loss.

Iodoform in Chronic Pulmonary Affections.

Prof. SEMMOLA was first to draw attention to the fact that iodoform, administered by the mouth, is in part eliminated unchanged by the lungs. Its probable topical action during elimination led him to employ it in lung-disease. He and many other good Italian authorities speak most favourably of its action, especially in caseous broncho-alveolitis, chronic pneumonia, and bronchial catarrh,

bronchiectasis, etc. In phthisis, the expectoration often diminishes rapidly and considerably, the cough is lessened, and the violent paroxysms disappear. The products existing in the bronchi, or in a more advanced stage in the foci of softening and caverns, are disinfected. The fever progressively diminishes, and he thinks that this diminution is in great part due to the local antiseptic action of the remedy, and to the diminution of putrid matter, which, becoming absorbed from the breaking up lung-tissue, represents one of the gravest consequences of the morbid process. The general health evidently improves, and cases in the first stage of caseous broncho-alveolitis may probably recover. The dose is from one-eighth of a grain to six or seven grains a day, and must be determined by the tolerance of the remedy by the digestive organs and the nervous system. It is best given in the form of a pill, with extract of gentian or other extract. He prefers to give it in small doses every hour, or every two hours. If it be not well tolerated by the stomach, it may be given in inhalation, dissolved in oil of turpentine, and administered three or four times a day.—*London Med. Record*, May 15, 1883.

Nitric, Nitrous, and Nitro-Compounds in Angina Pectoris.

Mr. MATTHEW HAY, at the close of an elaborate paper on this subject (*Practitioner*, May, 1883), summarizes as follows: Briefly stated, the conclusions to be drawn from the present experiments, and from those with nitrite of sodium, nitro-glycerine, and nitrite of amyl, reported in my previous paper,¹ are that nitrous acid in any combination, whether as an ether or a metallic salt, is useful in the treatment of angina pectoris; and, that, in the case of the nitrite of amyl, the action of the acid is aided by that of the base. On the other hand, all compounds of nitric acid, whether ethereal or metallic, are without effect, unless it so happen that the constitution of the nitrate is such that it decomposes in the body with the liberation of nitrous acid. Further, nitro-substitution compounds have likewise no remedial effect.

So far as at present known, the nitrogen-containing remedies for angina pectoris may be divided into two classes, the one consisting of combinations of nitrous acid with metallic oxides or alcoholic radicals, the other comprising a peculiar class of nitric ethers, obtained from the higher alcohols, whose decomposition within the body results in the production of nitrous acid. In both classes the action of the compound is ultimately dependent on the nitrous acid present. Typical examples of the first class are nitrite of sodium and nitrite of ethyl, and, of the second class, nitro-glycerine. To these classes might be added another containing such substances as compounds of amyl, whose action is similar to that of nitrites. But limited as this group at present is to compounds of amyl, it is not one to be chosen in the treatment of angina pectoris. The dose required is large, and the action is not rapidly produced, and disagreeable after-effects are apt to occur; and altogether I am very doubtful of its always acting so well as it did in the case of my patient.

Treatment of Angina Pectoris.

Prof. GERMAIN SÉE, in a recent lecture on angina pectoris says: The medicinal measures which I employ habitually are: 1. Bromide of potassium; 2. Digitalis; 3. Electricity (hardly habitually, but it deserves mention); 4. Arsenic (of which the same may be said); it is sometimes of use as a vaso-motor tonic, but its action is doubtful.

¹ *Loc. cit.*

Hydrotherapeutics ought to be absolutely proscribed.

1. Bromide of potassium determines contraction of the bloodvessels, calms the nervous system (particularly the centres of special sense), and induces sleep; it is a regulator of the peripheral movements of the blood. Under its action the patient becomes less impressionable to the physical and psychical influences which might provoke a return of the paroxysm. But this medicine has the grave inconvenience of producing a debility which is more or less permanent, and cannot be continued with impunity beyond a certain time.

2. Digitalis, when the thoracic angor results from cardiac atony or degeneration, presents a real advantage over the bromide; it fortifies and sustains the action of the heart, and is in every way the preferable medicament.

3. Electricity has been applied in divers ways, and in accordance with the different theories which have been put forth as to the nature of the malady. If employed from confidence in the pneumogastric-nerve theory of Eulenburg,¹ and an attempt be made to galvanize this nerve, you may run the risk of arrest of the heart's action; the unfortunate case reported by Duchenne is in proof of this.—*New York Med. Journ.*, May 26, 1883.

Purulent Pericarditis, Paracentesis, and Free Incision—Recovery.

At the meeting of the Royal Medical and Chirurgical Society, on April 24th, Dr. SAMUEL WEST reported the very interesting case of a boy, æt. 16, who had a large pericardial effusion. The symptoms became so urgent that paracentesis was performed. Pus was obtained. Three days later paracentesis was again performed, and subsequently the pericardium was laid freely open, evacuated, washed out, and a drainage tube inserted. The temperature never rose, and the boy recovered completely in five weeks, the only feature of interest being an attack of general urticaria, which came on about a week after the operation, and lasted three or four days.

In support of the diagnosis, a case of Sir J. Risdon Bennett's was referred to, in which what was supposed to be mediastinal cyst was frequently punctured, but proved to be on *post-mortem* examination a case of chronic pericardial effusion. The points of clinical interest discussed were: 1. The absence of any special signs to indicate the nature of the effusion; there was no friction to be heard before the operation, or mill-wheel sound characteristic of hydro-pneumo-pericardium after the free incision; 2. The operation (which was by preliminary puncture with a small trocar and cannula, and subsequently by free incision), and the place selected for puncture, viz., the fourth intercostal space, immediately below the left nipple; 3. The amount of the fluid evacuated, viz., fourteen ounces by the first tapping, and about two quarts by the free incision; 4. A peculiar epigastric prominence, noticed before paracentesis, which disappeared after operation; 5. The attack of urticaria; 6. The pulsus paradoxus, which was constant up to the time of the free incision, but ceased immediately after that. A short account was then given of the only other recorded case of incision of the pericardium for purulent pericarditis by Professor Rosentien, of Leyden, which also recovered.

Dr. West then gave the following *résumé* of the history of the operation, which was first suggested by Riolan, in 1649. Its practical introduction was traced to Dr. Rovers, of Barcelona, who operated successfully in two cases, in 1819. In

¹ Eulenburg, "Traité des maladies nerveuses," 1878. He describes two forms of the disease, one of which is due to direct excitation of the vagi nerves, the other to reflex excitation of these nerves. He also describes two other varieties of different nerve origin.

1841 there was a remarkable series of cases in an outbreak of scurvy in Russia, in which the pericardial effusion was composed mostly of blood. Nine were operated upon and six recovered. In 1854 Trousseau's essay was published upon some cases of his own and of M. Aran, which revived interest in the subject. In 1866 Dr. Clifford Allbutt introduced the operation to this country, and it was performed by Mr. Wheelhouse and Mr. Teale. Rosenstein, in 1871, made a great practical advance in operating by free incision with drainage. A complete list of the recorded cases up to date was given in a tabular form, with the addition of several cases hitherto unpublished, making 79 cases in all. Of these, 56 had been in males, for which no reason could be assigned, and they had been uniformly distributed over the early ages of life. Phthisis and pleurisy had been associated with 23 cases, rheumatism with 11, scurvy with 9, general dropsy with 5, injury with 3; in 12 cases there had been no associated disease. The fluid had been in 58 cases serous, in 12 purulent, in 9 bloody. The amount evacuated had been in 46 cases less, in 33 cases more than a pint. It was not rare to evacuate as much as two or three pints. The largest quantities had been found in the scorbutic cases, and from one of these about ten pints had been evacuated. It had been sometimes observed that great relief was given by the withdrawal of one or two ounces, and that this had been followed by the absorption of the rest of the fluid. Dieulafoy's careful experiments had led to the selection of a place in the fifth left space, about an inch from the sternum, as the safest point for puncture. The following conclusions were drawn: 1. Paracentesis pericardii is not only justifiable, but an operation which may be safely undertaken with ordinary precautions, for only one case is recorded in which the operation was in itself fatal, and, with this exception, all the patients were greatly relieved by the removal even of small amounts of fluid, and many recovered completely who would probably have died had the operation not been performed. 2. The most suitable place for puncture is, in ordinary cases, in the fifth left intercostal space, one inch from the edge of the sternum; but, if the pleura be adherent, the puncture may be made safely much further out, and even in the sixth space. 3. The instrument employed should be a trocar and cannula, with or without aspiration. 4. The operation may be performed with advantage, not only in the pericardial effusions of rheumatic or primary origin, but also in those which occur in the later stages of general dropsy, if it should appear that the fluid in the pericardium is adding to the difficulties under which the heart is placed. 5. Purulent pericarditis is best treated on general principles, like empyema. 6. The pericardial sac may be safely opened and drained. 7. This treatment, moreover, appears to be the only one which offers the slightest hope of recovery. 8. The results do not seem to be as unfavourable as those of empyema, for the walls of the cavity are better able to contract rapidly, and thus permit its complete obliteration.

Mr. HULKE hoped he should not be intruding on a subject of special interest to the physicians, if he made one or two remarks on the case which had been so admirably treated by Dr. West. He considered it more advisable to dissect down carefully to the pericardium before any incision was made; and, if a trocar and cannula were employed, he advised very cautious use of them, and that the trocar be frequently withdrawn, to form an opinion of the parts reached. He had himself, after medical consultation, in a case which was believed to be one of pericardial effusion, once inserted a trocar and cannula somewhat boldly, and the withdrawal of the trocar had been followed by a jet of blood, which gave him great anxiety, but happily relieved the patient. A subsequent *post-mortem* examination showed him that he had punctured the right ventricle, and that the case was one of universally adherent pericardium.

Dr. T. H. GREEN expressed some doubt as to whether the diagnosis of pericardial effusion should have been made in a case where no pericardial friction was heard, and in which the cardiac dulness did not extend higher than the upper border of the third rib, as was shown in Dr. West's diagrams. He advised preliminary exploratory puncture as in pleural effusions, but said the relief to be expected in the draining of the pericardium was less than in cases of empyema, for the cause of death in chronic pericardial effusion was rather the damage done to the cardiac muscle than the pressure of the pericardial fluid.

Dr. SOUTHEY congratulated Dr. West on his results, and remarked that the origin of the purulent pericarditis in his case was obscure; it certainly was not rheumatic, and there seemed to be no history of any such injury as sometimes set up purulent pericarditis after several weeks. He was inclined to suppose that the suppuration had not begun in the pericardium, but had extended into it from a neighbouring abscess; and in that case the low level which the upper border of the dulness reached would be explained. The dyspnoea and orthopnoea, he admitted, were sufficient grounds for interference; and he inquired if any difficulty of breathing had been noticed over the lower lobe of the left lung, such as was usual in cases of large pericardial effusion. He quite agreed with Mr. Hulke in advising cautious procedure and dissection before incision. Dr. West had mentioned one case only in which paracentesis had been immediately fatal, and he imagined that that was a case which they had both seen together; but he quoted a case of Bouchut's, and another within his own knowledge, in which there had been death within a short time. The pulsus paradoxus in these cases had first been noticed in an essay by Küssmaul, in 1869.

Mr. MARSHALL remarked that the old methods of procedure, which were sometimes by excision of a portion of the sternum or costal cartilages, were shown to be quite superseded. The soft elastic area at the epigastrium, which Dr. West had mentioned, pointed somewhat to a diagnosis of mediastinal tumour; and the rapid closure of the wound in thirty days was hardly to be expected if the incision had been in the pericardium and there had been constant motion of the heart to prevent healing. He asked if there had been any signs of endocarditis, or any cerebral symptoms, so common in purulent pericarditis.

Dr. S. WEST expressed himself as having felt guilty of timidity rather than of boldness in his treatment of the case; and that was perhaps not unnatural, as he had previously only seen one case of paracentesis pericardii—the same, he believed, as that to which Dr. Southey had referred; and there death had been immediate. The trocar and cannula used in his first tapping had been very small, and had been introduced very cautiously; it had only been thrust in up to its hilt when he had convinced himself that it was in a free cavity. There were some cases in which a correct diagnosis of pericardial effusion was almost impossible; and in some of these the right ventricle had been punctured, as in the case Mr. Hulke had related. He had not entered these cases in his tables. Often no harm had followed; and, indeed, in America, there were several cases in which the right ventricle had been intentionally tapped, and the operation had given some relief. Laceration of the ventricle, rather than mere puncture, had proved the fatal injury. He had not been surprised at the absence of pericardial friction in his case; nor had he felt it a point hostile to his diagnosis, for he imagined that, when he first saw the case, the effusion was too great to allow any rubbing together of the pericardial surfaces. The upper limit of dulness, which he had marked in the diagnosis was the limit of absolute dulness, and, he thought, was quite consistent with large pericardial effusion. That death was due in such cases to the pressure of the fluid on the heart, rather than to the degenerate state of the heart's muscle, as Dr. Green had suggested, was shown

by the relief afforded by the evacuation of the fluid. The pulsus paradoxus was not characteristic of pericardial effusion, but occurred in other cases where there was fibrous thickening in the mediastinum; and recent experiments had shown that it was due to mechanical pressure on the inferior vena cava, by which the complete filling of the heart was prevented. The condition of the epigastrium in his case was similar to that in Dr. Allbutt's case, which was one of undoubted pericardial effusion, and argued against his case having been really one of mediastinal tumour. He had observed no endocarditis, but did not feel that that was any argument against the pericardial nature of the case; for endocarditis would only be expected, as Dr. Southey admitted, in a rheumatic case, and he had not anything to lead him to suspect that his case was rheumatic.—*Brit. Med. Journ.*, April 28, 1883.

Perisplenic Abscesses.

M. C. ZUBER, in a study of encysted purulent collections of the peritoneal cavity, draws the following interesting conclusions regarding perisplenic abscesses:—

1. Perisplenic abscesses are purulent collections in the upper part of the abdominal cavity, only partially touching the spleen, and by no means confined to the cellular, subserous tissue of that organ. They are more usually situated in the irregular space bounded by the stomach, the spleen, the colon, and the diaphragm, and are the result of a circumscribed peritonitis, due, ordinarily, to lesion of the spleen or digestive tract. Infectious splenitis (including paludal lesions), and round ulcer of the stomach appear to be the most usual factors in the causation of these abscesses.

2. Purulent collections, due to lesions of the digestive tract, contain gas, and this complication is shown by a symptomatic list of remarkable constancy, resembling, more or less, the symptoms of pneumothorax, but distinguished from the latter affection by the fact that the diaphragm is forcibly pushed up. Its nature is also recognized by the grave symptoms on the part of the digestive organs, followed by variability, exaggeration, or insufficiency of the physical signs.

Purulent collections of splenic origin are characterized, to some extent, by tumefaction, and pain in the hepatic region, and the general symptoms of latent suppuration, rarely by more or less marked and fluctuating tumours. The diagnosis must generally be made by exclusion.

3. These abscesses are not beyond the reach of modern surgical art. Frequent and deep exploratory punctures should be made, and when found the pus should be evacuated.—*Gaz. Hebdom.*, April 13, 1883.

Habitual Constipation.

Dr. J. MORTIMER GRANVILLE gives the following three prescriptions for the treatment of habitual constipation. He regards persistent inactivity of the bowels, when not demonstrably due to other causes, as the result of, either defect of peristaltic action; deficient glandular secretion; or, interruption of the *habit* of periodic evacuation.

1. When there is a lax and torpid condition of the muscular coat of the alimentary canal, we get food retained in the stomach or intestines until it ferments, or sometimes "decomposes," with the result of distension, pain mechanically induced, and either eructations or incarcerated flatus. I have recently seen a very considerable number of cases in which this last mentioned trouble had been so great, and at the same time so masked, as to have given rise to the impression

that grave disease existed; whereas every anomalous symptom has quickly disappeared as soon as the muscular tone has been restored, and the contents of the bowel have commenced to pass naturally on their course. The essential fault is partial, in some instances almost complete, loss of the reflex contractility of the muscular coat, so that the presence of ingesta at any part of the canal does not excite the intestine to contract and propel it onwards. It is worse than useless to employ ordinary aperients in such a condition as this; they only irritate, without strengthening, the nerves on the healthy activity of which everything depends. When, therefore, this is the form of "constipation" which requires treatment, I give a prescription something like the following; and it is, in the majority of instances—of course nothing is uniformly—successful.

R.—Sodæ valerianatis gr. xxxvj; tincturæ nucis vomicæ ℥℥; tincturæ capsici ℥℥℥; syrupi aurantii ℥jss; aquâ ad ℥vj. Misce, fiat mistura, ejus sumatur cochleare magnum ex aquâ ter die semihorâ ante cibum.

2. The second form of constipation, in which there is a deficiency of glandular secretions, generally throughout the intestine, manifested by a peculiarly dry and earthy character of the dejecta when the bowels *do* act, I treat by a mixture such as this:—

R.—Aluminis ℥ij; tincturæ quassiae ℥j; infusi quassiae ℥vij. Misce, fiat mistura, ejus sumantur cochlearia duo magna ter quotidie, post cibum.

3. The third form, which depends chiefly on interruption of the natural habit of periodic discharge, often results from repeated failure to move the bowels, in consequence of one or other of the two preceding forms of this trouble. This may generally be relieved by directing a perfectly regular attempt to go to stool, and by the use of the following draught, taken the first thing after *rising* from bed—not on awaking—in the morning, as nearly as possible at the same hour. It will be observed that it is not an aperient in the ordinary sense of the term. It is, as a rule, neither necessary nor desirable to continue it for longer than a fortnight. In most instances, it will be found to re-establish the normal habit in a week or less:—

R.—Ammoniæ carbonatis ℥j; tincturæ valerianæ ℥j; aquæ camphoræ ℥v. Misce, fiat mistura: capiat partem sextam in modo dicto.—*British Medical Journal*, May 26, 1883.

Percussion of the Colon in the Diagnosis of Diarrhœa.

Dr. GOEDICKE calls attention to the importance of percussion over the colon in diarrhœa, as a means of diagnosing between the different types of the affection, and, consequently, as an indication for treatment. Having proved, by careful observation, the fallacy of his first idea, that diarrhœa must necessarily be accompanied by an empty colon, and consequently a tympanitic percussion-note, he instituted a systematic percussion of every case which came under his observation, which led him to the following conclusions. 1. On percussion of both iliac fossæ in a healthy individual with regular evacuations, the (relative) dulness is generally found on the left side. 2. In patients suffering from diarrhœa, the dulness is found sometimes on the right side, sometimes on the left; oftener, in Dr. Goedicke's experience, on the left, in otherwise healthy persons, in whom the diarrhœa has not been long continued. 3. In children, the proportion is the same. 4. If pain on pressure be present, it is on the same side as the dulness. 5. The dulness is always to be understood as being merely relative; the actual note may even be loudly tympanitic, if the intestine is inflated by gas. Dr. Goedicke divides ordinary catarrhal diarrhœa into two groups, equally distinct in symptoms and in treatment. The first, which is the most common, occurs in otherwise

healthy persons as the result of a chill or of an error in diet, supervening upon some derangement of the normal relation between the food and the reflex sensibility of the intestine, which has caused an accumulation of feces in the lower bowel, in spite of a daily evacuation. The symptoms are severe, cutting pains across the abdomen, following directly on the ingestion of food, and accompanied by urgent calls to stool, and the evacuation of fluid stools, mixed with shreddy masses, and very offensive, which may attain a frequency of sixteen to twenty in twenty-four hours. The appetite is generally good, and the tongue clean; there is no fever, and the pulse is normal in strength and frequency, although a heat may be occasionally intermitted. The abdomen is prominent, and any tenderness which may be present is found in the left iliac fossa; but the point on which the author lays most stress is the greater relative dullness on percussion on the left side, which is constantly present, whether the other symptoms be well-marked or slight. This is the form of diarrhœa which is met with in infants and children; and its proper treatment in all cases is mild purgation, opiates and astringents being contra-indicated, although a dose of opium may be given at first if the pain be very severe, or if it be advisable to let the exhausted patient have a few hours' rest before the laxative action commences. Dr. Goedicke recommends decoction of frangula for adults, and small doses of calomel for children. The diarrhœa of the second group has its seat in the small intestine, and is the form most often treated of in text-books. The patients have been cachectic and delicate, with feeble digestion, and are sometimes tuberculous. The exciting cause may be an error in diet, or a chill, but often there are only to be found symptoms of the existing cachexia. The abdomen is soft and sometimes retracted, but it may be distended from meteorismus, and there may be gurgling in the ileo-cæcal region. In all cases, however, the relative dullness is found in the *right* iliac fossa. The appetite is small, and the stools seldom exceed two or three in twenty-four hours, but they are copious and watery, and are generally unaccompanied by pain. The treatment in these cases consists of opiates and astringents, with suitable diet, warmth, etc. The author concludes his paper with the opinion that the more percussion is employed in cases of diarrhœa, the more will opium as a remedy retreat into the background.—*London Medical Record*, May 15, 1883; from *Deutsche Medicin. Wochensch.*, No. 7, 1883.

Alterations Produced by the Distoma Hæmatobium in the Urinary Passages and Large Intestines.

Dr. ZANCARAL, Physician in Chief of the Greek Hospital at Alexandria, has recently presented a memoir to the Medical Society of the Hospitals of Paris on this subject.

The *Distoma Hæmatobium* is a trematode of separate sexes. The male is cylindrical, measuring about $\frac{1}{8}$ inch in length, and possesses a cavity into which the female is received during the act of fecundation. The female is longer than the male by about $\frac{1}{8}$ inch, is thinner and more filiform. The ordinary habitat of the trematode is the blood of the portal vein, the mesenteric, vesical, and hemorrhoidal veins. The male is provided with two suction apparatus which enable it to fasten itself to the walls of the bloodvessel. The existence of the eggs and embryos of the parasite in the urine, which becomes bloody from alteration of the vesical mucous membrane, and their more rare presence in the fecal matters, is the means of determining their presence in the organism. The presence of eggs in the substance of the tissues shows grave pathological lesions. Zancaral presented two specimens showing this, from two patients. One died with symptoms of chronic intestinal ulceration. The autopsy showed that the walls of the

descending colon, the sigmoid flexure and the rectum, more thickened and enlarged almost entirely at the expense of the mucous coat. The internal surface was converted into a mass of vegetations having the appearance of hemorrhoids. These vegetations run from $\frac{1}{16}$ to $\frac{1}{8}$ of an inch high, with a very enlarged base. In the intervals the surface is sometimes granular, sometimes smooth. In some cases the vegetant and granular forms are united. These lesions are due to infiltration of the mucous membrane by the eggs of the distoma, and if a microscopic examination be made of the submucous layer, it is seen to be full of the eggs, the same being true of the tubular glands. The eggs are ovoid, shaped like a pumpkin seed, about min. 0.170 long, and often present a lateral spine, which is only found in the eggs of the intestinal tunic. In the urinary apparatus this spine is at one extremity of the egg. The eggs are undoubtedly laid in the hemorrhoidal veins, for it is here that the adults of both sexes are found. The mechanism of their passage through the walls of the vessels into the tissues is unexplained.

The second specimen presented was from a man dead of uræmia, in whose urine the eggs had been found during life. The kidneys were much enlarged, surfaces crumpled, containing cystic cavities, and the distinction between the cortical and medullary substance had disappeared, the renal structure was composed solely of an homogeneous layer, and was indurated. Some small pisiform abscesses were found in them. The ureters were enlarged and tortuous, the walls considerably thickened, the internal surface velvety. The walls of the bladder were enormously hypertrophied, and $1\frac{1}{8}$ inch thick, the cavity being about the size of a walnut. The hypertrophy was mostly at the expense of the muscular layer, which was very hard. Microscopic examination showed that the eggs existed in small quantity in the superficial layer of the vesical mucous membrane, the epithelium having disappeared. The right kidney presented the ordinary lesions of hydronephrosis, the left those of advanced interstitial nephritis. The patient, then, had had cystitis caused by the eggs of the distoma, and this affection caused the lesions of the ureters and kidneys; for the eggs were not found in the kidney in this case, and are so found only exceptionally. The disease is not always fatal, as has been stated in certain works on the subject; the evidence of it being found in a great number of Arabs, some of whom recover.—*Journal de Méd. de Paris*, May 19, 1883.

Leucoderma.

Dr. THOMAS F. WOOD, of North Carolina, in describing a case of leucoderma, occurring in a negro woman, who had a carotid aneurism, but was otherwise in good health, says: The course of the increase of the area of leucoderma was not steadily progressive, but in waves. This patient was examined at varying intervals, and the margin of pigmented patches carefully traced upon her photograph. It was discovered that the black patches would recede on one side, and increase upon the other; and especially upon the face the margins were not so abruptly black at all times, but fading into the white by imperceptible gradation. The increase of absorption rapidly advanced in the five years preceding this writing, until now she has more the appearance of a blonde white woman with black patches on her face.

The condition of the skin is very peculiar. To the casual observer it appears much thinner than the skin of a negro, suggesting the idea of the obliteration of the rete mucosum. So highly sensitive is it that a moderate sun burns and the intense summer sun blisters it. The slightest scratch causes free bleeding, and nose-bleed is easily provoked, and recurs again and again. The nasal tract is exceedingly sensitive, and, as I have remarked in another place, does not bear

out the theory of Mr. A. R. Wallace, that the deficiency of smell in some animals is due to the absence of pigment there, for this patient has unusual acuteness of this sense.

It is well known to those physicians who have watched syphilitic diseases among these people that the shade of their skin frequently changes to several degrees lighter, and that this change is permanent and uniform over the whole body. The lack of complete analogy between this sort of alphasia and leucoderma, strictly so-called, is that the transformation does not occur in patches.

I reported a case some years ago (1876) in the *London Medical Examiner* of a very black negro who had leucoderma succeeding typhoid fever. He had no white patches previously. His business was that of a sawyer, and exposure to the rays of the sun upon newly sawed lumber became very painful to him. This man's hair did not turn white, nor did his skin become so sensitive, and there was not that abrupt demarcation between the white and black as in the case above reported. After several years of rapid alphasia, pigmentation began again, and I am able to reaffirm what I previously reported, that the process still continues. The skin is not becoming so black as natural, but the change has been repeatedly noticed by his friends.

These three types of alphasia may lead us in the future to a more correct study of the causes. 1. We have leucoderma in a woman who had no noticeable change in her health from beginning to end. 2. We have the entire skin changing several hues lighter after an attack of constitutional syphilis. 3. We have a leucoderma succeeding convalescence from typhoid fever, in which there is resorption of pigment, and a gradual redeposit. Are these all examples of a different disease? Or are they different manifestations, varying degrees of a process which has a central origin elsewhere than in the skin?—*Journal of Cutaneous and Venereal Diseases*, June, 1883.

SURGERY.

Transplantation of Skin-Flaps from Distant Parts without Pedicle.

Dr. J. R. WOLFE, Senior Surgeon to the Glasgow Ophthalmic Institution, has lately written an interesting paper on this subject (*Practitioner*, May, 1883), in which he says, that while practising M. Reverdin's method of skin-grafting in which little bits of the size of a pin's head are taken and arranged in mosaic fashion upon the ulcer, or upon the site of deficiency of the skin, he was never satisfied with the macadamized appearance of the parts. He also noticed a very important fact in connection with skin-grafting, namely, that the graft which was taken clean adhered satisfactorily, while the bits which had a bleeding under-surface did not adhere to their new site. He thus became convinced that the cause of non-success in transplantation was the areolar tissue underneath, and that, if we could transplant a skin-flap free of that subjacent tissue, we should secure its adhesion and incorporation. To put this to the test, he operated in one case in which the skin required for the eyelid was two inches in length by one inch in breadth. He removed the flap from the forearm in three portions, separating the first from its cellular tissue as closely as compatible with the integrity of the flap, but turning up the other two after removal, and with a knife slicing off the areolar tissue so as to leave a white surface, which I then applied to the eyelid. The

difference between these flaps was very remarkable. The two which were previously prepared healed by agglutination, without even desquamation of the cuticle. Twenty-four hours after the operation, the surfaces looked pale, but the next day the temperature was normal, and the appearance healthy. The part which had been applied without previous preparation looked rather livid the first day, improved for the next two days, but on the fourth began slightly to suppurate, and, after a hard struggle for life, only a portion of it remained and the rest shrank. This, however, did not compromise the result of the operation, which was on the whole satisfactory, and he was therefore enabled to formulate the conclusion that, if we wish a skin-flap to adhere to a new surface by first intention or agglutination, we must be sure that it is free of all areolar tissue, and properly fixed in its new place. When thus prepared, we may cut the flap of any shape or size from any other part, or from another person, and transplant it without pedicle.

Removal of Extensive Cavernous Angioma of the Scalp by the Elastic Ligature.

Dr. GEORGE R. FOWLER, of Brooklyn, gives the details of the following interesting case: Lizzie K., æt. 6 mos., was presented at the East Brooklyn Dispensary Clinic, Jan. 30, 1883, with the history of a congenital tumour, which had been slowly enlarging, although it had apparently caused the little one no particular uneasiness. Upon examination there was found an ovoid tumour, moderately soft and elastic, having no communication with the brain, but situated external to the right parietal bone at its posterior superior angle, covering an area about 7 cm. by 5 cm., and its entirety raising the scalp about 2 cm., entirely subcutaneous, of a bluish colour, and seemingly made up of enlarged capillary vessels and fibrous tissue. Its position favoured free anastomosis of branches of the occipital and posterior temporal arteries; no pulsation, however, could be felt.

On February 2d the following operation was performed: No anæsthetic was used. The scalp was first thoroughly washed with a 1 to 40 solution of carbolic acid, and ordinary antiseptic precautions adopted. Four straight needles without cutting edges were selected, threaded with common band elastic of pure gum rubber, and passed subcutaneously beneath one side of the growth in succession, each successive needle with its ligature entering at the point of exit of the last one.

Next the ends of the elastic were re-threaded in turn, and the needle in each case made to re-enter the original puncture, and keeping well down to the base of the tumour it was carried through and out of the opposite side. The remaining ligatures were carried across the base in the same manner in turn. The projecting ends of each loop were passed through apertures in a narrow strip of sheet lead, then grasped by dressing forceps, made tense, and finally secured while thus tense by clamping with split shot.

The entire mass was inclosed subcutaneously in four loops of elastic ligature, and subjected to gradual, yet firm, constant pressure. It was hoped that healing would take place behind the ligatures as they cut their way gradually through the base of the tumour, as occurs when a fistula-in-ano is treated in an analogous manner, therefore as much tension was not placed upon the loops as might have been exercised. Hemorrhage was avoided, the entire operative procedure being completed with but slight oozing from the punctures in the scalp, and the attendant pain was surprisingly slight, not justifying the use of an anæsthetic. The parts were covered with powdered naphthalin and absorbent cotton, drop doses

of deodorized tincture of opium, ordered in case the child gave evidence of suffering pain.

On February 6th the dressings were removed, the ligatures tightened, again clamped with drilled shot, and redressed as before. No hemorrhage. February 11.—Ligatures have cut completely across base of tumour, and the latter is held loosely attached to the scalp by the portions of integument between the points of original entry of ligature. These were encircled with other elastic loops, when the complete separation of the mass occurred. The parts were then dressed with iodoform.

On February 13th, the surface was irrigated with 1 to 40 carbolic solution, and dressed with naphthalin. February 14.—Redressed with naphthalin. Granulating healthily. February 19.—Applied five skin grafts containing hair follicles, and dressed with naphthalin gauze. February 24.—Four of the grafts appear to have taken. Redressed as before. March 5.—New skin formation from margin of grafts extended to circumference of original granulating surface.—*Annals of Anatomy and Surgery*, June, 1883.

Tracheotomy in Croup and Diphtheria.

Dr. H. LINDNER has recently published (*Deutsche Zeits. f. Chir.*, Bd. xvii., Hft. 6) 106 cases in which tracheotomy had been performed in hospital and private practice for croup and diphtheria, by the author himself or under his direction. In one of these cases death occurred on the operating table, and in another, in which the condition was quite hopeless, the operation was performed in order to keep the patient alive until the arrival of the parents. Of the 101 remaining patients sixty-three died, or 62½ per cent.; and thirty-eight, or 37½ per cent., recovered. In seventy-nine cases in which obstruction of the air-passages was the prominent morbid condition, forty-four, about 55.7 per cent., were fatal; in the twenty-two cases in which this condition was subordinate to symptoms of intense general infection, all the patients died. A tabulation of the author's cases, giving the proportion of deaths and recoveries at different ages, seems to indicate that after the second year there is a marked change in the relation of successful to fatal cases. Whilst in the second year the mortality is 88.8 per cent., in the third year the percentage of recoveries is 55. The author refrains from drawing any positive conclusions from these figures. The reduced proportion of fatal cases with advance in years might in his practice have been due to chance, and other and more extensive tables might show quite different relations. The proper time for operating, it is thought, is that when well-marked retraction of the *scrobiculus cordis* is first observed. If the surgeon delay in operating far beyond this stage, the prognosis becomes very unfavourable; and, on the other hand, if he decide on intervening at an earlier date, he may see his patient recover after the proposal to operate has been rejected by the friends, an event, Dr. Lindner states, which would serve neither the reputation of the doctor nor a desirable popularization of the operation. Unfortunately, in most cases, as the child is often brought to him at too late a period, the surgeon is seldom able to operate at the first appearance of this special indication.

In all save five of the tabulated cases, Dr. Lindner performed superior tracheotomy. In one case only was the operation done below the isthmus of the thyroid gland. In two cases the isthmus was divided. Considerable hemorrhage resulted in these, and also in one case in which a much swollen thyroid gland was lacerated. The superior operation, he holds, is specially indicated in the case of an infant, or young subject in whom the thymus still exists and is well developed. He has never met with profuse hemorrhage or any serious complica-

tion in performing the superior operation; and he cannot understand why the inferior method should be preferred in operating on young subjects of croup or diphtheria.

The administration of chloroform during tracheotomy is recommended in all cases, save those in which there is intense asphyxia. No disadvantage, it is stated, ever attends the use of this anæsthetic in favourable cases; on the contrary, when the patient is well under its influence, the breathing becomes deeper and less rapid, the cyanosis is diminished, and the operation can usually be performed without undue haste.

In the after-treatment of his early cases of tracheotomy for croup or diphtheria, Dr. Lindner trusted mainly to inhalations of lactic acid in a two-per-cent. solution. Of late, he has used only pure steam. The only way, it is now thought, in which inhalations can act beneficially after tracheotomy, is by preventing an accumulation of dry and firm secretion within and below the canula. That a moist and warm inhalation can do this is not to be doubted; but here the action ends, as no inhalation, whether simple or medicated, can favour separation and discharge of the false membrane. Continuous and forcible application of hot steam is not free from danger, especially when lactic acid or any conducting agent has been added. Reference is made to the results of some experiments made by Heidenhain to determine the cause of pneumonia after tracheotomy. In these observations it was shown that, so long as the air respired by a tracheotomized animal is dry, no matter whether the temperature of this air be high or low, not the slightest damage is done to the lung; whilst on the other hand, air that is moist and heated to 130° , or above this, will set up lobular pneumonia.

In some of his recent cases he has practised aspiration, which he regards as a very efficacious means in the after-treatment of patients subjected to tracheotomy, and of service when croup has extended below the bifurcation of the trachea, and attacked the mucous membrane of the bronchi and their divisions. By this treatment the air-passages may be cleared of accumulated secretion, which is the cause, in many cases, of still impeded breathing after tracheotomy, and which cannot be ejected spontaneously. Of nine cases of tracheotomy in which aspiration was subsequently tried, eight were successful—a striking result, he points out, as several of these were really severe cases, and five of the patients had bronchial croup.

He regards apomorphia as a valuable agent in the after-treatment, if given in sufficiently large doses. It excites an abundant watery secretion from the bronchial mucous membrane, and thought that it might thus favour separation and removal of the false membrane. A favourable influence in this respect has, it is stated, been exerted by apomorphia in several recent cases, in some of which it was found necessary to perform tracheotomy.

An important point in the after-treatment in cases of tracheotomy is the removal of the tube. This should be removed as soon as the air-passage is sufficiently free; but as to when this is really the case, there is likely to be much difference of opinion amongst surgeons. In cases in which the patient is well nursed and constantly watched, and surgical aid is close at hand, the tube may be removed at an earlier period than in cases where such conditions do not exist. Dr. Lindner states that when, after removal of the tube and temporary closing of the wound, the patient breathes freely and can speak with a clear and strong voice, there is no longer any necessity for the tube to be replaced.

Next to symptoms of general infection, pneumonia is the most frequent complication after tracheotomy in cases of croup and diphtheria. A rise of temperature above 102° on the first or second day after the operation is to be regarded as a bad sign. In cases of this kind the patient, according to Dr. Lindner's expe-

rience, rarely recovers. Impairment of deglutition through paralysis is regarded as but a temporary result of diphtheria, and one needing no special treatment in the majority of instances. Ulceration of the mucous membrane through pressure of the tube may be avoided, Dr. Lindner thinks, by inserting an instrument sufficiently large to occupy the whole calibre of the trachea. The shield of the tube in ordinary use is considered to be too broad.—*London Medical Record*, May 15, 1883.

Excision of the Abdominal Wall.

Prof. SKLIFOSOVSKY reports a case in which he excised nearly the whole left half of the left anterior half of the abdominal wall on account of an enormous sarcomatous growth. The patient, æt. 24, had received a kick from a horse about four years before, and six months after noticed a small lump, at the situation of the blow, which remained unchanged for three years, and then began to grow very rapidly. When first seen it had attained the size of a man's head. The tumour occupied the whole left side of the abdominal wall, from the edge of the ribs to Poupart's ligament, and, at the level of the umbilicus and three centimetres lower it involved, also, about four finger-breadths of the right side. The circumference of the growth at its base was 81 centimetres (nearly 32 inches), the long diameter 40 centimetres (15.75 inches), the transverse, 39 centimetres (15.3 inches). The tumour was dense and heavy. The integuments over it were movable, and traversed by numerous dilated veins. The patient's general health was excellent.

On November 10, the operation was performed (under the strictest antiseptic precautions). It commenced by a vertical incision along the linea alba, from the end of the ensiform cartilage to the pubes, and by an arched incision along the left costal border. After dissection of the integuments, it was found that the tumour encroached on all the muscular layers and the parietal peritoneum. Accordingly, the next step consisted in four incisions through the whole thickness of the abdominal walls, namely: 1. An internal vertical one along the whole linea alba, with deviation to the right in the degenerated portion of the umbilical region; 2. an upper transverse incision along the costal edge; 3. a lower transverse, carried a finger-breadth above Poupart's ligament; and 4. an external vertical incision along the left axillary line, from the ribs to the crest of the ilium. The removal of the excised parts left a formidable defect, through which there were seen, fully exposed, the stomach, omentum, bowels, and a considerable part of the liver. After cleansing the abdominal cavity, the viscera were covered by the integumental flap, and two thick drainage-tubes, each 10 centimetres long, were introduced, one near the umbilicus, another above the pubes. The wound was covered by Lister's dressing, over which were placed several large pads of wadding, in order to secure considerable pressure on the anterior abdominal wall. The wound healed by the first intention. On November 11 and 12, the temperature rose to 38.2° C. (100.75 F.), and then fell to the normal, to rise once more to 38.0° C. (nearly 100° F.) on the 24th. The second elevation coincided with the appearance of abundant suppuration under the flap near the navel. During some days there were daily discharges of about three tablespoonfuls of thick pus through the upper drainage-tube. On Dec. 3 the purulent discharge stopped, and recovery since went on fairly.

On March 5, 1882, the patient left the author's clinic quite well, being furnished with a suitable supporting apparatus made of poroplastic and two duly curved steel springs. On inspection of the patient (with the apparatus off) lying on her back, there was no bulging seen, except during coughing; but in the

erect position, the left half of the abdominal wall was considerably bulged outward, even during normal breathing.

The excised neoplasm, weighing 4100 grammes (9½ pounds), proved to be a spindle-celled sarcoma.

Prof. Sklifosovsky mentions that the first patient from whom he in 1877 removed a large sarcomatous growth, involving likewise the whole thickness of the abdominal wall (see the *Voyenna-Mediz Jurnal.*, July, 1877), is still in excellent health. She also wears a supporting apparatus, preventing eventration, and feels quite comfortable.—*London Med. Record*, May 15, 1883.

Healing of Wounds of the Spleen.

A. DANNENBURG (*St. Petersburg Inaug. Dissert.*, 1882) wounded, in various ways, the spleen in fourteen dogs, killed the animals in periods varying from 24 hours to 108 days, and examined numerous specimens (taken from twenty-eight wounds) microscopically. He sums up his results as follows: 1. Incisions into the spleen are prone to rapid union; some amount of gaping occurs only on the surface of the organ. 2. Incisions into the pulp are prone to heal without suppuration. 3. Suppuration of the splenic tissue, in the course of a wound, occurs only as a rare exception. 4. Adhesion of the splenic capsule to the omentum, which develops very rapidly, is one of the conditions leading to healing of wounds of the spleen. 5. Perforating wounds heal slowly, and always through development of granulation-tissue. 6. Punctured wounds heal by the first intention. 7. Amputation-wounds of the spleen heal by its adhesion to the omentum, resulting from the formation of connective tissue between the parts. 8. In the formation of a scar, both the proliferating elements of the splenic pulp and the epithelioid elements of the reticulum take part. 9. Hypertrophy of the subserous layer of the capsule depends on the proliferation of cells of connective-tissue. 10. There is proceeding an extremely active proliferation of capsular epithelioid tissue around the edges of a wound. 11. There is proceeding a complete regeneration of the epithelioid covering on the surface of a cicatrix left by a wound. 12. Under certain conditions, common epithelioid cells may undergo transformation into cylindrical and cuboid epithelioid elements.—*London Med. Record*, May 15, 1883.

A Case of Nephrectomy for Rupture of the Kidney where Lateral Cystotomy was also subsequently performed for the Relief of Cystitis caused by Retained Blood-Clots.

Dr. HENRY G. ROWDON reported, at a late meeting of the Royal Medical and Chirurgical Society (*British Med. Journal*, May 26, 1883), the following case of this:—

Charles M., aged 12, was admitted into the Liverpool Infirmary for Children on December 7, 1882. The previous day he had fallen into a stone basement, a distance of about eight feet. On admission he was found to be passing blood in his urine. He complained of some pain in his right side. The only other evidence of an injury was a small bruise-mark over the crest of the ilium. The diagnosis was that rupture of the right kidney had been caused by the injury. The hæmaturia for the first few days diminished, but it subsequently increased, and was followed by acute cystitis. With the object of preventing blood from entering the bladder, on the seventeenth day after the injury, the injured kidney was removed by a lumbar incision, and then it was found to have been torn nearly completely across. Relief followed the operation. Subsequently, symptoms of acute cystitis again showed themselves. On the twenty-first day after the injury,

and four days after the nephrectomy, lateral cystotomy was performed, when fetid clots were removed, and a free drain of the urine was established. Relief was afforded by the cystotomy so far as the symptoms directly traceable to the bladder were concerned. The patient died on the fortieth day after the injury. The cause of death appeared to have been pyelitis and circumscribed suppuration of the left kidney, lesions probably traceable to an extension of the cystitis which had been occasioned, partly by the presence of decomposing clots, and partly by attacks of retention of urine. It was suggested that, if cystotomy had been performed earlier, the latter consequences might have been averted.

Case of Excision of an Enlarged Cancerous Kidney.

Sir SPENCER WELLS, at the same meeting, narrated the case of a gentleman, aged 58, whose left kidney he removed last December. It measured six inches by four, and was the seat of the soft cancer. The patient died on the fifth day. The operative procedure was described, and the author urged the importance of uniting, in all cases of nephrectomy by abdominal section, not only the divided peritoneal coat of the anterior abdominal wall, but also the divided peritoneal covering of the kidney. In this case he was content with letting the two edges fall together, and he thought that blood or serum exuding from the tissues behind the peritoneum might have passed into the peritoneal cavity, or that some portion of intestine might have adhered there. This might have been prevented by a few sutures. He had not seen this detail in the operative proceeding referred to in any previously recorded case of nephrectomy.—*British Med. Journal*, May 26, 1883.

Nephrectomy.

The narrative of the preceding cases gave rise to a very interesting discussion at the Royal Medical and Chirurgical Society's meeting of May 22, 1883.

Dr. DICKINSON expressed as a physician, his sense of the great debt of gratitude which was due to the surgeons who had brought stone in the kidney within the list of curable diseases. As to the excision of tumours in the kidney, there was more to be said. These were chiefly sarcomata of a very malignant type. He had examined the *post-mortem* records of 19 cases, and found one point prominent, namely, that there were secondary growths in all of them but three. That showed their malignancy; and he was, on the whole, against their excision, for it was impossible to estimate them until they were far advanced, and then an operation was only rendered justifiable by some such accident as hemorrhage. Sir Spencer Wells's case, he submitted, was not explained by the *post-mortem* examination. The blood which was so freely passed could not have come from the kidney which was excised, for the malignant kidney did not bleed till it had fungated and broken through the capsule, which had not happened in the kidney which had been cut out. The blood, he was inclined to think, must have come from the remaining kidney.

Mr. BARWELL recommended a lumbar incision for removal, whenever it was practicable, but remarked that the rib was, in many people, too near to the crest of the ilium to allow of this. He agreed with Sir Spencer Wells's suggestions as to sewing up the peritoneal covering of the kidney when an abdominal opening had been made, but wished to take a further step in such cases, and to drain through the loin the cavity behind the peritoneum, where there might be bleeding or suppuration.

Mr. LAWSON TAIT took objection to Dr. Dickinson's opinion against excision

of the renal tumours, on the ground that a diagnosis of malignant disease was often impossible. He believed that they were all malignant in patients under fifteen, and again almost all at an advanced age; but such a case as Sir Spencer Wells's, he thought, might have been one of hydatids. An abdominal incision in front was advisable, as securing an opportunity of investigating the state of the kidney which it was proposed to leave behind in cases of nephrectomy. The history of Dr. Rawdon's case led to a suggestion, made after the event, that it would have been desirable to open the bladder first to ascertain the origin of the bleeding, and then, if the urine had continued to show blood, to make an incision for the kidney.

Mr. KNOWSLEY THORNTON was sorry to admit that he had been unable to throw adequate light on his own case. (See p. 293.) He was inclined to think that the origin of the disease had been in the obstruction of both ureters in the very early pregnancy of his patient (aged 15), and the formation thereby of a sacculated kidney. In comparing the operations of nephrectomy and nephrotomy, he was inclined to prefer the former, as giving a better chance; and allowing, if performed from the front, of some evidence being taken as to the state of the other kidney, which would have been very important in such a case as Mr. Doran's. He could not agree with Sir Spencer Wells's suggestion as to the sewing up of the peritoneal covering of the kidney, to prevent fluid getting into the perineum; for he thought that, if a fluid was aseptic and free from putridity, the peritoneum was the best tissue to absorb it. He felt, with Mr. Tait, the difficulty of diagnosing the malignancy of the renal tumour to be dealt with. One kidney, which he had excised, and which he showed as a specimen, was a case of alveolar sarcoma, which would certainly not recur soon. In another case, he had been so convinced of the malignant character of the growth by secondary deposits, that he had refused to operate; and, in some doubtful cases, he thought an exploratory operation would be justifiable. In a case in the country, he had come to the conclusion that excision would be the best treatment, had obtained the patient's consent, and arranged the operation. A clergyman, however, stepped in and imposed his veto, under spiritual penalties on the patient, and the man died without operation. After death, a non-malignant sarcoma of the kidney was found, which could have been easily removed by operation. Mr. Tait had expressed doubts as to whether a diagnosis of fresh bleeding from the kidney, or discoloration of the urine by blood-clots in the bladder, could be made in Dr. Rawdon's case; but he thought an examination of the urine would have very readily settled that. In conclusion, after having himself performed nephrotomy in three cases, and nephrectomy in four (two by median incision, two by Langenbuch's incision), he preferred the nephrectomy by abdominal incision.

Sir SPENCER WELLS said he very heartily agreed with what Dr. Dickinson had said in some points; but he thought the difficulty of diagnosis of malignant renal tumours was greater than Dr. Dickinson had estimated. For instance, one of the most distinguished physicians in the world had thought the tumour in the case he had brought forward to-night was splenic. Against its malignancy, he had the long duration of the tumour—for several years at least—and the absence of evidence of any secondary deposits; and, even if he had thought it to be certainly malignant, he was inclined to think he ought to have removed it; for the patient was bleeding to death before his eyes, and it was a surgeon's duty to stop that. In another case of tumour of an undescended testis, which was probably malignant, he decided to remove it, after consultation with Sir James Paget, as he certainly should have removed it if it had been in the scrotum. He was much obliged to Mr. Barwell for his suggestion of "draining" the cavity behind the kidney; and should be inclined to adopt it, keeping at the same time

to his first idea of carefully sewing up the peritoneal covering of the kidney. Mr. Thornton's success in attacking kidney diseases through the abdomen had first led him to attempt such an operation; but many more facts were still necessary before the value of the various methods proposed could be fairly estimated.

Dr. SOUTHEY suggested that a physical exploration of the kidney to be left in the abdomen might be practically avoided by an estimation of the amount of urea passed; for from a normal amount of urea, a normal amount of secreting kidney-tissue might be inferred.

Mr. BARKER pointed out that a foreign observer had come to a conclusion opposite to Dr. Dickinson's, as to the great malignancy of renal growths; for, out of one hundred and thirty cases, he had found few instances of secondary tumours. In a cancerous kidney he had himself excised, he had only found one or two traces of recurrent tumour in the lung, and none anywhere else.—*British Med. Journal*, May 26, 1883.

Resection of the Intestine.

Prof. EDWARD VON WAHL, of the Dorpat Hospital, has recently published in the *St. Petersburger Medicinische Wochenschrift*, two highly interesting cases of resection of the intestine.

Three years ago, Dr. von Wahl operated on a man, aged 47, for strangulated inguinal hernia. The intestine involved in the rupture was found to be partially gangrenous; the healthy portion on each side of the slough was, therefore, sewn to the edge of the external wound, and the gangrenous segment was cut away. An artificial anus was thus established. Six weeks later, in order to cure this complication, two inches and a half of the intestine around the abnormal opening were resected, and the edges of the gut above and below the seat of excision were united by a single row of fine catgut sutures. The portion of intestine that was excised proved to be part of the transverse colon. Death, preceded by symptoms of peritonitis, followed on the third day. At the necropsy, it was found that two of the sutures had become loose, allowing extravasation of feces.

Last October, Dr. von Wahl had occasion to perform excision of the intestine under more unfavourable circumstances. In removing a dermoid ovarian cyst from a woman, aged 26, a portion of the ascending colon was found to be intimately adherent to its surface. As the walls of the tumour, especially along the line of adhesion, were undergoing malignant degeneration, Dr. von Wahl did not consider it justifiable to merely separate the adherent intestine from the cyst, but determined upon performing excision. The ascending colon lay deep in the flank, owing to the shortness of the meso-colon. The pellicle of the tumour was first ligatured, and the omentum was separated from the tumour, which had no pelvic adhesions. A clamp-forceps was then applied to the colon on each side of the adherent part, the teeth being guarded by strips of India-rubber sheeting. The adherent portion, four inches and a half in length, was now cut away, and afterwards set free from the meso-colon. This last part of the operation was rendered difficult by the great size of the vessels in the peritoneal fold; but, by a careful arrangement of sponges over the adjacent viscera and peritoneum, no blood escaped into the peritoneal cavity. The ovarian tumour was then cut away. A double row of carbolized silk-threads was now passed through the cut edges of the colon. The first row, consisting of thirteen sutures, transfixed the serous and muscular coats. The second or higher row, including ten sutures, passed only through the serous coat. Apposition of the cut edges of the colon was found to be perfect. The patient made a rapid recovery, a free motion being passed on the eighth day. Unfortunately, a month after the operation, the patient began

to complain of symptoms which led Dr. von Wahl to believe that the malignant disease of the ovary had recurred in other abdominal organs.

It is clear that, in a case of this kind, excision does not present the difficulties which are encountered when the operation is performed for the relief of chronic obstruction, or the removal of a malignant segment of intestine. Dr. von Wahl found no difficulty in securing apposition of the cut edges of the upper and lower ends of the intestine, after that the sutures had been introduced, for there was no contraction of the inferior nor dilatation of the superior portion of the severed ascending colon, as seen in cases of stricture. Hence the clamps, applied in the simple manner above described, proved sufficient for the operator's purpose, without the application of the ingenious contrivance introduced by Mr. Treves, and exhibited at a meeting, last December, of the Royal Medical and Chirurgical Society; yet, even in this case, the use of the India-rubber dilating bag would have greatly facilitated the application of the sutures.—*British Med. Journal*, May 26, 1883.

Abdominal Tumour consisting of Hair.

At the Twelfth Congress of the German Surgical Society Prof. SCHÖNBORN exhibited a tumour, composed entirely of hair, which he had removed from the stomach of a chlorotic and scoliotic young girl, who had been annoyed for three years by gastric troubles. The diagnosis, when first examined, seemed to rest between tumour of the spleen, omental tumour, and floating kidney. The tumour, the situation of which was not constant, was situated in the left half of the abdomen, and was of a kidney shape so far as could be determined through the abdominal walls. Laparotomy was performed, and the tumour found in the stomach itself. It had somewhat the shape of a contracted stomach, measuring three inches along its greater curvature, and was of the appearance of the collections of hair sometimes found in the abdominal cavities of cattle. During the convalescence the patient admitted that she had been in the habit of biting off the ends of her hair for several years. Prof. Schönborn has found seven similar cases recorded in literature, the first being in 1777. Contrary to the opinion of Cloquet, that this only occurs in persons mentally diseased, Schönborn states that none of the seven cases were mentally affected. The true diagnosis was not reached in any of these cases, and they all died, either of peritonitis or excessive vomiting, and one of hæmatemesis. In one case the tumour, taken from the intestine, was twenty inches long, and was carried for twenty years.

In the discussion elicited by this paper Prof. Küster said that the diagnosis of floating kidney might have been excluded as, under an anæsthetic, the left kidney can be distinctly felt below the twelfth rib, and the right also, though not so distinctly as the left.—*Berliner Klin. Woch.*, April 23, 1883.

Fatal Hemorrhage from Nævus of the Rectum.

At the meeting of the Royal Medical and Chirurgical Society, on April 10, Mr. ARTHUR E. J. BARKER offered this case for special consideration on the following grounds: 1. On account of its rarity; no similar case being known to the author after careful search. 2. On account of the gravity of the condition in this special instance, in which, in a particularly strong and healthy adult, slow death from bleeding was the result. All the symptoms usually met with in those dying of loss of blood appeared to be present here. Beyond these, there were few special symptoms noticed as dependent on the condition. The patient, whose earliest symptoms was an attack of diarrhœa accompanied by great loss of blood,

usually suffered from constipation, and was obliged to strain much during defecation. Sometimes, however, he had intervals of diarrhoea, always with great loss of blood, and felt no pain and lost no flesh, and there was no particular discharge from the rectum except during the attacks of bleeding. 3. Because a diagnosis of the condition was made by inspection of the rectum with a strong light. This was thrown up the bowel by a forehead mirror from a powerful lamp, and through a large vaginal speculum, which could always be introduced under chloroform. The treatment suitable to such cases was a point that might be usefully discussed. By this inspection, the mucous membrane of the bowel was seen to be marked by smooth longitudinal folds, mottled with a peculiar purplish tint. On these purplish folds were three shallow ulcers, whence blood flowed freely. The patient gradually sank, in spite of various remedies, and died from loss of blood. After death, the wall of the rectum was found to be much thickened in the lower four inches and a half of its length by nœvoid growth in its walls, on the rugæ of which were the three shallow ulcers before described. The body in other respects was healthy and well developed, but almost free of blood.

Mr. Howard Marsh related the history of an essentially similar condition in a girl aged ten, under his care at the Children's Hospital in Great Ormond Street. She had been subject to attacks of hemorrhage from the bowel from the time she was two years old. They had occurred at first at intervals of about a year, but after a time had grown more frequent, coming on about every month. The amount of blood passed varied from a teaspoonful to a teacupful. Whilst under his care, he had himself witnessed two or three hemorrhages of the larger amount. The symptoms of the case undoubtedly pointed to a nœvus; and on examination of the rectum with a speculum, he found a nœvus encircling nearly the whole of the bowel close to the border of the anus, and reaching about an inch and a half up the rectum. The aspect of the growth left no doubt as to its nature. Treatment with Paquelin's cautery was found effectually to arrest the hemorrhage for a time, but it was impossible to use such treatment over any large surface, for fear of producing a stricture of the anus. The position of the growth afforded no chance for ligature. The child was three times in the hospital, and was discharged finally with its hemorrhage greatly relieved, but not entirely cured.—*Med. Times and Gaz.*, April 28, 1883.

Controlling Hemorrhage in Amputation at the Hip-Joint.

Mr. JORDAN LLOYD describes a new method which he has several times employed for controlling hemorrhage in amputations and excisions at the hip-joint. It is an adaptation of Esmarch's method. The limb is first elevated and stripped of blood. A strip of black India-rubber bandage about two yards long is then doubled and passed between the thighs, its centre lying between the tuber ischii of the side to be operated on and the anus. A common calico thigh roller must next be laid lengthways over the external iliac artery. The ends of the rubber are now to be firmly and steadily drawn in a direction upward and outward, one in front and one behind, to a point above the centre of the iliac crest of the same side. They must be pulled tight enough to check pulsation in the femoral artery. The front part of the band passing across the compress occludes the external iliac and runs parallel to and above Poupart's ligament. The back half of the band runs across the great sacro-sciatic notch, and, by compressing the vessels passing through it, prevents bleeding from the branches of the internal iliac artery. The ends of the bandage thus tightened must be held by the hand of an assistant placed just above the centre of the iliac crest, the back of the hand being against the surface of the patient's body. It is a good plan to pass

the elastic over a slip of wood held in the palm of the hand, so as to diminish the pain attending the prolonged pressure of the rubber bandage. In this way an elastic tourniquet is made to encircle one of the innominate bones; checking the whole blood-supply to the lower extremity. The elastic bandage may be secured above the iliac crest in the usual manner with tapes, and may be prevented from slipping downward by being held with a common roller tied securely over the opposite shoulder. Experience has shown, however, that no mechanical means answer so well as the hand of a trusty assistant. When the band is once properly adjusted, the assistant has only to take care that it does not slip away from the compress or over the tuber ischii. The former is prevented by securing pad and tourniquet together with a stout safety pin; and the latter by keeping the securing hand well above the iliac crest, or even more safely by looping a tape beneath the elastic near the tuber ischii, passing it behind under the sacrum and having it held in that position. The solid rubber tourniquet may be used instead of this bandage. I prefer, however, the bandage. The soft parts are less damaged by reason of its greater breadth, and it is less likely to roll off the compress placed over the external iliac.

The ligature, being altogether above the limb, is out of the way of the surgeon in any operation at or about the hip-joint. The great trochanter is fully exposed; the hip being free upward as far as the iliac crest, and inward to the perineum.

The bandage has the following advantages over Davy's lever: 1. The simplicity and certainty of its application; no previous experience being necessary to compress the vessels, there is no possibility of going wrong. 2. The security with which the vessels are controlled, regardless of the movements of the patient or manipulations of the operator. 3. The freedom from danger of injury to the rectum or abdominal contents. (Davy related a case at a recent meeting of the London Clinical Society, in which he himself had wounded the rectum with his lever; the patient dying on the following day of peritonitis.) 4. Its applicability to cases in which the rectal lever could not be employed, as in strictures of the bowel, intra-pelvic growths, and arterial abnormalities. 5. It requires no special apparatus.—*Lancet*, May 26, 1883.



Ligation of large Arteries by the Application of two Ligatures and Division of the Vessel between them.

Mr. W. J. WALSHAM has recently tied the femoral artery three times in this manner. In each instance, two ligatures were applied, a little less than a half an inch apart, and the artery completely divided between them. The ligatures used were kangaroo-tail tendon; the wounds did well; the operations were performed strictly antiseptically; and in each instance the patient made a good recovery.

In the discussions that have been raised from time to time at the medical societies, and at the last meeting of the British Medical Association, on the value of different kinds of ligature, carbolized and chromicized catgut, ox aorta, whale tendon, carbolized silk, carbolized nerve, kangaroo-tail tendon, etc., it has always seemed to me that a very important point in accounting for failure has been lost sight of. Want of success has nearly always been attributed to the fault of the ligature used, and little or no account has been taken of the way in which it was applied. It is true that different opinions have been expressed as to whether the ligature should be tied tightly or loosely; whether or not it should be our aim to divide the internal and middle coats of the artery; or whether the mere contact of the ligature with the vessel is not sufficient to accomplish our purpose. The point to which I would refer as influencing the result of the operation is the amount of separation of its sheath that the artery has been subjected to in passing

the ligature. That failure, in some instances, has been due to the softening or giving way of the material used, there can, of course, be no question; but I cannot help thinking that too free a separation of the sheath in passing the ligature may have had, in many instances, more to do with the want of success than the kind of ligature chosen. As the vitality of an artery depends in great measure upon the blood-supply that it receives from its sheath, it is easily conceivable how very little more or less separation may determine the success or failure of the ligature. No point, I suppose, is more strongly insisted upon in the works of surgery than the necessity of exposing as little of the vessel in its long axis as possible.

If two ligatures be applied, and the vessel divided between them, all risk of too free a separation of the sheath is absolutely avoided, as one ligature can be applied at the spot where the sheath is separated above, and the other where the sheath is separated below. After the vessel is divided, each cut end retracts, drawing the respective ligature well into the sheath, thus leaving the blood-supply of no portion of the vessel on the proximal and distal side of the upper and lower ligatures respectively in any way interfered with. The artery is thus placed under very nearly the same conditions as one which has been ligatured in a stump, and exactly under the conditions as one the ends of which have been secured in a wound, and from such secondary hemorrhage is very rare. Indeed, I am not aware that, after the two ends of a divided vessel have thus been tied in a wound, hemorrhage, except from the slipping of a ligature, has ever occurred.

The normal longitudinal tension of the vessels constitutes another, and I believe not inconsiderable, source of danger in ligaturing an artery in its continuity. A transverse wound of an artery, as first pointed out by Mr. Savory, in consequence of this elastic tension, assumes a diamond shape. Should any part of the ligature cut through the vessel before it has become permanently occluded, this tension, by causing such a cut in the vessel to gape, thereby disturbing the connection of any internal clot that may have formed, or adhesions of the coats that may have taken place, must tend to the production of secondary bleeding. In a case of secondary hemorrhage under the late Mr. Callender, on cutting down at the seat of ligature to secure the bleeding points, the hemorrhage was clearly seen to be due to such a cause. The vessel, which had been secured by a catgut ligature, had given way opposite the knot (which itself was intact), and a gaping wound one-tenth of an inch wide existed in the walls of the vessel. By applying two ligatures, and dividing the vessel between them, all tension is taken off, and both ends are placed in a state of rest—the most favourable condition for healing.—*Brit. Med. Journ.*, April 7, 1883.

Deligation of the Common Carotid.

WELJAMINOW, of St. Petersburg, has collected thirty-three cases (*Deutsche Med. Zeit.*, No. 40) in which the common carotid was tied. The artery was ligatured four times for hemorrhage due to wounds, once for angioma, fifteen times for malignant tumour, for or during operations on the head eight times, four times for operations about the neck, and once for aneurism (Brasador-Wardrop's method, *i. e.*, ligature on distal side of sac). The right artery was tied eighteen times, the left fourteen (*sic*); eighteen times in men, fifteen in women. The age of many of the patients (fourteen) was between fifty and sixty; in two cases, however, the age was seventy-two, and in one only twenty-one months. These last three patients got over the operation very well. The wound healed by first intention sixteen times. Erysipelas and secondary hemorrhage were each observed once only. To prevent the occurrence of cerebral disturbance the artery

was systematically compressed some days before ligation. Eleven out of the thirty-three patients died soon after the deligation (33.3 per cent.), but for statistical purposes only 25 (? 23) are available, of which one died, giving a mortality of 4 per cent. The author has collected yet other twenty cases, all treated antiseptically, and all recovered. In conclusion, the writer dilates on the importance of a double ligation, between which the artery is divided.—*Med. Times and Gaz*, Oct. 28, 1882.

Nerve Stretching.

Dr. CECCHERELLI (*Lo Sperimentale*, 1882) contributes a very complete and interesting summary of the literature and results of this operation. He divides his subject into two parts. In the first he collects the anatomical and physiological facts, and in the second he describes the operation, the indications for its employment, and the results so far obtained.

As to how much the nerve is to be stretched, he cites many experiments in animals, and gives Frombetta's careful experiments as to the weight the different nerves removed from the body are able to sustain. He does not think these experiments of much practical good; the surgeon must be rather guided by the sensation of greater or less elasticity and resistance which he experiences. The anatomical lesions are of the perineurium, capillary vessels, and nerve-tubes, causing exhaustion and degeneration. The physiological effects are interruption of the ascending sensory current and continuance of the descending motor current; hence, perhaps, the frequent failure of nerve-stretching in tetanus (Artaud and Gilson). Quinquaud observed that in the stretching of the sciatic nerve, for example, there was also anæsthesia of the area innervated by the sciatic of the opposite side, and sometimes also in that of the crurals of the two sides. On stretching the right sciatic, there was anæsthesia of the right limb posteriorly; stretching shortly afterward the left sciatic, there were anæsthesia of the left limb posteriorly, and return of sensibility in the right limb. When a nerve is stretched, the effect is therefore transmitted to the posterior part of the medullary axis. Labord and Debove divided the spinal cord and caused epileptiform movements: they stretched the sciatic nerve, and the movements were suddenly diminished. Wiet and Mareus found that when the pneumogastric was stretched, the movements of the heart were accelerated.

The conclusions from these facts, and, as corollary, that the stretching of a nerve produces ecchymosis under the perineurium, rupture of the nervous fibres, and ascending degeneration, as in partial section of a nerve, would be, that nerve-stretching causes loss of sensibility; that the sensory ascending current disappears, while the motor or descending current is preserved; that it affects the centres and may cause trophic disturbances with persistence or not of anæsthesia. Moderate stretching produces anæsthesia in the territory of the nerve without loss of motility; violent stretching causes prolonged and persistent anæsthesia with constant alterations of motility and nutrition. The frequency of functional disturbances of parts far from the seat of operation proves that the spinal cord is influenced by the stretching of certain nerves (the sciatic and brachial plexus); for lesser nerves and for cords farther from the medulla, further researches are necessary. Notwithstanding the microscopical lesions which have been observed, the manner in which the distension acts is not yet determined (Chauvel).

In the second part, Dr. Ceccherelli describes the operation. He recommends the incision to be made as near the supposed seat of irritation as possible, the stretching to be made in the centrifugal and centripetal directions, and not excessive, with the finger or blunt hook. With the finger the surgeon is best

able to judge, by the elasticity and resistance, of the force required. Nerve-stretching has been tried in many diseases, peripheral neuralgia, spasmodic affections, epilepsy, paralysis, tetanus, ataxy, anæsthesia in leprosy, etc. The author collects 252 cases, the results being 37 deaths, 16 failures, 34 cases improved, 156 cures, and 9 in which the result is not stated. Nerve-stretching has been most successful in peripheral neuralgia; out of 99 cases 74 were cured, 12 improved, 7 doubtful, and only 6 failures. In contractures, 14 cases, there were 12 cures; in facial tic, 7 cases, 6 cures; in traumatic spasms, 12 cases, 10 cures; in peripheral paralysis, 34 cases, all successful. Although experiment proves that nerve-stretching influences the spinal cord, in disease of central origin its effects are unsatisfactory. In 36 cases there were 5 cures, 16 improved, 7 failures, 8 deaths; epilepsy, 4 cases, 1 delayed success, 3 improved; tetanus, 45 cases; 14 successful, almost, if not all, cases of partial tetanus only; 2 results not stated, 29 deaths. In ataxy it has been most unsuccessful. Langenbuch gives 16 cases with 6 cured; but Bernhardt and Westphal say they have never seen a case improved or cured. Debove thinks the "lightning" pains may be relieved by it. Vizioli also thinks that mechanical distension of the hyperæsthetic nerves, inducing a changed position of nervous molecules, may modify the molecular grouping by which excitability was exalted, and the return to the normal state may ensue. The author concludes that in all cases in which the lesion is peripheral the effect is certain, almost without danger, and more prompt than any other mode of treatment. In central lesions, all means fail; in extreme ills, extreme remedies; therefore it is only to be tried in extreme cases. If by it we could promise improvement or diminution of any one of the grave symptoms, it would be the surgeon's duty to operate, but as yet we cannot say even that much.—*London Medical Record*, April 15, 1883.

Subperiosteal Resections.

The following *résumé* is given at the conclusion of an original memoir by Professor Ollier on subperiosteal disarticulations and amputations (*Revue de Chirurgie*, Nos. 7-12).

1. Amputations practised with a periosteal flap or cuff (*manchette*), though they have not always furnished results differing very much from those of ordinary amputations, are in these days of antiseptic dressings attended with results more conformable to such as surgeons have been led by experiment to expect. They favour immediate union, but in young subjects they are liable in certain regions to result in inconvenient osteophytic formations. In adults, subperiosteal amputation is not likely to cause this unsatisfactory result.

2. Subperiosteal amputation in the continuity of a bone, with preservation of the whole of the periosteal sheath and of the peripheral tissues beyond the limits of the section of the bone, gives rise in young subjects to the formation of an osseous mass, which is very useful for maintaining the length and solidity of the stump.

3. All disarticulations, with the exception of those practised for relapsing neoplastic lesions (osteosarcoma, medullary cancer, etc.), ought to be performed by the subperiosteal method. Traumatic lesions and gunshot wounds furnish the most favourable conditions for the application of this operative method.

4. These disarticulations are to be practised on the same principles as those by which we are guided in subperiosteal resections. The incisions practised in this latter class of operations will serve in the disarticulation of most of the bones, whether the surgeon amputate after having attempted to perform resection or proceed at once to disarticulate.

5. Subperiosteal disarticulations have great advantages over the older methods of resection, with regard to the performance of the operation. In cases where, for some reason or other, the surgeon cannot have recourse to artificial exsanguification, he can operate with but little loss of blood. The hemorrhage is always less severe than in operations by the older method, in which large flaps are formed and thick masses of soft parts cut through. In stripping away the soft parts from the bone, the surgeon is able to preserve all the elements that are useful for the constitution of a thick, well-padded, and even stump. In infants and young subjects one may obtain, by preserving the periosteum, a new and movable bone in the stump, and thus considerably improve the orthopædic result of the operation.

6. In subperiosteal disarticulations the wounds are limited by a fibrous membrane, which circumscribes the injury and forms a barrier against diffuse inflammations. All other things being equal, they are less dangerous than ordinary amputations, which leave a more extensive and irregular wound, since in subperiosteal disarticulations the flap is formed directly from the muscular mass, and the bone can be carefully dissected out; whilst in the older methods of amputation the muscular spaces are freely opened, and there is a risk of cutting vessels and nerves longitudinally. Moreover, the surgeon, in this latter class of operations, sacrifices healthy tissues which would have served to form part of the stump.

7. Of almost impossible application before the discovery of surgical anæsthesia, in consequence of the time they require and of the pain which they would cause to the patient, subperiosteal disarticulations cannot be met with any objection at the present day, since the question of the duration of an operation has become one of quite secondary importance.

8. In subperiosteal disarticulations, only a bistoury and raspatory are required, and a small knife, which will be found useful in the last stage of the operation (section of the soft parts). The use of large knives should be abandoned in such operations.

9. Although the longitudinal incisions of subperiosteal resections may serve in general manner for subperiosteal disarticulations, it will be found advisable to modify these to a slight extent in the latter operations. The bone should be approached in the readiest and most direct way, without any attempt being made, as in resections, to maintain the integrity of the muscles surrounding the articulation.

10. A circular operation is most suitable in performing subperiosteal resection. The wound is less extensive, and the bleeding surface is reduced to the surface of transverse section of the flesh and to the surface of the periosteal sheath.

11. If, as in cases of neoplastic lesions of osseous or periosteal origin, it be found necessary to abstain from performing subperiosteal resection, the surgeon should have recourse to periosteal resection; that is to say, he should, in separating the soft parts from the bone, follow the external aspect of the periosteum. In cases of malignant new growth, the knife should be applied as far as possible from the bone, in order to guard against local relapse.

12. In the majority of subperiosteal disarticulations (shoulder, hip, elbow), it is necessary to attack the joint as speedily as possible, in order to open the capsule and displace the end of the long bone. This having been exposed and stripped of its periosteum, the soft parts are to be completely divided. In other regions (knee) it is better to separate the soft parts in the first place, and to cut the flaps before disarticulation.—*London Medical Record*, April 15, 1883.

Resection of the Wrist.

Dr. G. NEPVEU, after reviewing in a general way the operative, functional, and therapeutic results of this operation, with a table of sixty cases, draws the following conclusions: 1. Carpal, radio-carpal, and carpo-metacarpal resections for pathological causes, only compromise life to a slight extent, especially when treated antiseptically. 2. They sometimes give good results in that they suppress the local affections and preserve a useful member. 3. The completely good results are only observed in one-fourth of the cases; much more frequently there is incomplete recovery, and very imperfect re-establishment of the functions of the limb—in a word, operative and functional unsuccess. 4. The graver complications are equally common. In some cases the operation is fatal directly or indirectly; in others it does not arrest the local lesion, and amputation of the forearm is necessary; and in still other cases, though the result of the operation seems to be good, the general health of the patient does not improve, and finally the patient succumbs to tuberculosis. 5. From the point of view of definite and complete cure, the curative power of resection of the wrist is feeble. 6. This deficiency of curative power is due, in a measure, to the fact that the operation is often performed under very unfavourable conditions; the operation is contra-indicated in cases of osteo-arthritis, and especially in tendinous and articular synovitis. In these cases amputation should be performed at once; it is contra-indicated in old and phthisical persons, and should only be exceptionally performed in cachectic scrofulous subjects. 7. To ameliorate the functional results as little bone as possible should be removed, and the dorsal and palmar periosteoligamentous structures should be preserved. 8. The operation should only be performed after the other therapeutic resources have failed—immobilization, compression, revulsion, drainage, prolonged antiseptic baths, etc. The combination of these means gives excellent results when the constitutional state is so bad as to forbid operative interference. No reference is had in these remarks to resections for traumatism.—*Revue de Chirurgie*, May, 1883.

Resection of the Knee.

OLLIER, in an exhaustive paper on this subject, in which he gives details of eight cases and his method of operating, draws the following conclusions: 1. Antiseptic dressings have completely changed the indications and prognosis of resection of the knee. While formerly it was wise and prudent to ignore many of the indications for this operation in hospital practice, at present it would be irrational to amputate the thigh in many cases in which resection of the knee is applicable. 2. In infants, on account of the dangers of ulterior increase of bone, the expectant method of treatment in suppuration of the knee and the employment of more simple procedures than resection must still be insisted on, as arthrotomy, articular abrasion, drainage, etc. In fact these proceedings may be resorted to at all ages, but resection of the knee should be preferred to amputation. Amputation should be performed in the grave forms of tubercular arthritis. 3. The gravity of resection of the knee is no greater to-day than is that of amputation of the thigh. The cases reported (by Ollier) show that success is the rule in resection in the same conditions in which it was formerly the exception; and one should prefer amputation to resection, or *vice versa*, on other grounds than the mere gravity of the operation. 4. Osseous ankylosis should always be desired and sought for after amputation of the knee, but in case this cannot be obtained, a solid articulation should be attempted. 5. The subperiosteal method enables one to obtain this result. It accumulates about

the surfaces of the section, the tissues most favorable for ossification, and in case there is non-union a musculo-ligamentous band is preserved completely encircling the new joint—the bones, kept together by the passive resistance and the muscles, play on each other with sufficient solidity. 6. It is difficult to appreciate, with the data now in our possession, the value of resection of the knee in military surgery. It may be at least presumed that we can obtain results just as good as in civil surgery if proper care can be given to the wounded. 7. All the anterior transverse incisions opening the joint may be used. It is necessary only to make the incisions of less length than heretofore, as it is important to preserve the lateral ligaments. An incision should be made on a level with the posterior border of the condyles of the femur, and an incision on each side for drainage. 8. In chronic suppuration of the joint it is generally necessary to remove the patella, preserving its anterior periosteal coating. The patellar ligament is preserved by suture. 9. In comminuted fractures of the articular extremities, longitudinal are preferable to transverse incisions. The longitudinal, median, anterior incision, cutting off longitudinally the patella and patellar ligament, facilitates the operation and preserves all the elements for the re-establishment of a new joint, at the same time favouring ankylosis, should that be desired. 10. In osseous ankylosis of the knee subcondyloid osteo-clasis should be practised. It is especially applicable in ankyloses of traumatic or rheumatic origin, when flexion cannot be performed, or cannot be carried further than a right angle, and when there are no deep cicatricial bands in the popliteal space. 11. Subcondyloid osteotomy or resection are preferable where there is reason to fear that vessels or nerves involved in the cicatricial tissue may be wounded. In these cases total resection of the condyloid enlargements should be practised if the cicatricial adhesions are deep and many, and if flexion passes a right angle. 12. Resection of the condyloid swelling is the only operation to be performed when there are signs of osseous inflammation. In these cases when flexion goes beyond a right angle, we should not be contented with taking out a wedge; a trapezoidal fragment should be taken out. This is the only way in which to bring in contact the surfaces of section without provoking painful traction, and dangerous to the circulation of the limb.—*Revue de Chirurgie*, May, 1883.

OPHTHALMOLOGY AND OTOTOLOGY.

Chloroma.

Nearly fifty years ago, BILLROTH is said to have described a form of malignant growth distinguished by a green discoloration, whence we derive the name of chloroma or "green cancer" (Billroth). There can be no question that the disease is of rare occurrence. In 1878, Huber (*Archiv der Heilkunde*, xix.) was able to collect only seven examples. The tumours are not cancerous in the modern sense of the term, and so may best be described as chloro-sarcomata, or, more simply, chloromata. Such tumours have been met with in connection with bones (*e. g.*, the skull), but perhaps the chief centres of the lymphoid tissue of the body are the seats *par excellence* of tumours of a green colour, this anatomical system having become involved in a secondary manner, or even having been the primary seat of disease.

As an apparent example of this, we shall describe the main features of an interesting case recorded in Virchow's *Archiv* for January, by Louis Waldstein

A man, aged forty-four years, by occupation a labourer, suffered from a short attack of "ague" many years before the commencement of his present illness. Without any assignable cause the symptoms of marked progressive anæmia set in rather suddenly. Satisfactory collateral evidence of the nature of the disease was not forthcoming; the urine, however, was noted to be of a green colour, and there was rather high persistent fever. On the twenty-fifth day of the illness the patient complained of pain on percussion of the sternum, and later also of some of the ribs. Gradual enlargement of the spleen and liver was detected by the ordinary methods. A great increase in the number of the white cells of the blood was first observed on the forty-first day of the illness; repeated observations negatived the existence of leucocythæmia before that date. Death followed in three days, on the forty-fourth day of the malady. At the post-mortem examination, the mediastinal glands were found to be much enlarged and coloured green; the retro-peritoneal glands and those of the portal fissure were also stained green. Although there were plugs of leucocytes in the hepatic capillaries, distinct areas of hyperplasia of the lymphatic tissues of the liver were not observed. It will be remembered that some investigators regard the white areas in the kidneys and liver of cases of leucocythæmia as extravasations from the blood-vessels. The spleen was enlarged, the Malpighian corpuscles being much overgrown. The medulla of the bone was red, and in many places was of a greenish hue. Wherever the chlorotic tint was seen, the microscope revealed either a diffuse "coloration" or the pigment existed in granules in the protoplasm of the cellular elements. The green tint has been severally described as apple-green, gray-green, grass-green. The results of chemical analysis have been by no means satisfactory. Huber thought the pigment was that of a fatty body, Balfour regarded it as biliverdin, Dressler suggested its identity with the colouring matter of greenish pus, whilst Dittrich has advanced the notion of its dependence on putrefaction. Waldstein is inclined to believe the coloured pigment was derived from the colouring matter of the blood, and he points to its general presence in the morbid tissues and to its passage with the urine as favouring his view. It is not at all improbable that every form of pigment occurring in the human body may ultimately be traced to one original source, viz., hæmoglobin.—*Lancet*, April 21, 1883.

MIDWIFERY AND GYNÆCOLOGY.

Treatment of Placenta Prævia.

Dr. HOFMEIER's conclusions (*Zeitschrift f. Geb. und Gynæk.*, 1882), and methods claim our attention on account of the excellence of his results. His experience extended over forty-six cases, thirty-five of which were delivered in one year, and thus offers an excellent chance to judge of the method carried out by him. He first excludes from the forty-six cases three who were so far gone from hemorrhage when he arrived that there was no chance for any treatment. Of the remaining forty-three, in nineteen the situation of the placenta was central, in sixteen lateral, and in eight marginal—a very large percentage of central placenta-tions. The usual rule of treatment is to tampon until the cervix is sufficiently dilated. This rule the author opposes. He scarcely ever uses a tampon, and as to the cervix his rule is only to wait till clear symptoms of labour set in, i. e., either uterine contractions or funnel-shaped dilatation of the cervix. He then

proceeds as actively and speedily as possible. This rule was followed in thirty-seven of the forty-three cases, after unfavourable experience in other methods with the rest. In nineteen cases the cervix was perfectly dilated, in eighteen either entirely closed or with only a funnel-shaped dilatation. The earlier the operation the more of necessity is the choice of it limited to the combined external and vaginal version with one or two fingers, the Wigand-Braxton-Hicks method. This was done in thirty cases, the foot was brought down in three breech cases, three times internal version was performed, and once the forceps applied. The combined turning was practised as long as possible, and the hand introduced into the uterus only when absolutely necessary. The feet having been guided to the os are seized, and by firm traction the buttocks effectually stop the hemorrhage. In cases of central position of the placenta, the author, in spite of all the arguments against it, is in favour of perforating the placenta, and bringing the feet through. He did it in five cases, in three of which it was necessary on account of haste, and in two of which the child was already dead. It gives the mother the best chance, and the child's chance is by any method in such a case extremely small. The rest of the delivery, the author expressly states, should be *slowly* accomplished. The condition of the child may modify this rule, but even this must not make us increase the mother's risk. "The physician must have the courage to let a doubtful child's life be lost in his hands, rather than subject the mother to increased danger. The child is to be delivered *slowly*." Even so, the author's results were not bad as regards the children. Of thirty-seven, seventeen were already dead; of the twenty still living, six died (three premature, and three from perforation of the placenta). Altogether, sixty-three per cent. died, and thirty-seven per cent. lived, which is up to the usual standard. The statistics as regards the mothers, however, are much better. The author considers in them not only the immediate result, but the after course of the case. In each case ergotin was given subcutaneously during extraction, and the uterus was washed out afterward with a five per cent. solution of carbolic acid. Of the thirty-seven patients treated by these rules, *one* died. She had been treated for twenty-four hours by tampon, and the placenta was foul and offensive when the delivery took place, and she died seventeen days after from phlegmon and phlebitis of the thigh. The author believes she would have surely been saved if action had been prompter. This one case, out of thirty-seven, gives a mortality rate of 2.7 per cent., which is far above any published rate, others having been 10 per cent., 16 per cent., and 40 per cent. After hemorrhages occurred in some cases, but none which could not be controlled with ergotin, ice, and hot-water injections. Of the six cases treated at an earlier date, and by the *waiting* method, one died; two had a long severe lying-in; four children were dead. Of the whole forty-six cases, therefore, five died—10.8 per cent. The author adds two useful hints as to the situation of the placenta. In nearly central situations, the smaller portion is on the lateral side, which is more loosened from the cervix lip. In placenta prævia the proportion in favour of the right side is about 11 to 4.—*Practitioner*, May, 1883.

Treatment of Post-partum Hemorrhage in Cases of Placenta Prævia.

In cases of post-partum hemorrhage of placenta prævia, and due to atony of the uterine tissue at the point of placental insertion, KLOTZ advises the following procedure: The right hand is introduced into the vagina, and with the left pressure is made upon the fundus through the abdominal wall, so that the uterus, firmly compressed between the two hands, is anteflexed. The thumb of the right hand is then introduced into the vagina, and occupies the angle formed by the neck and body of the uterus, and presses on the tissues at this point. In

this manner the whole lower part of the uterus is compressed, partly by its ante-flexed position, partly also by the action of the hands, and especially by the thumb of the right hand. Klotz has used this method in two cases. Pressure was kept up for half an hour in one, and forty-five minutes in the other case; in both cases the hemorrhage was arrested perfectly.—*Bull. Gén. de Thérap.*, May 30, 1883.

Metria.

At the meeting of the Academy of Medicine in Ireland, on February 23d, Dr. ATTHILL read a paper on metria (so-called puerperal fever). He said that our knowledge of the various affections included by the Registrar-General under the term metria, still far from perfect, had of late been steadily increasing. It was now all but universally conceded (1) that there was no such single disease as puerperal fever properly so-called, that is, a specific disease in the same sense as scarlatina or smallpox; (2) that inoculation and absorption of septic matter conveyed from without formed a not unfrequent cause of one form of metria, viz., puerperal septicæmia; and (3) that puerperæ frequently became self-inoculated by poisonous material generated within their own bodies, either by the decomposition of retained clots or shreds of membranes or placenta, the resulting fever being by some called puerperal sapræmia, in contradistinction to septicæmia. He held that the septicæmic form of metria could only be communicated from one puerperal woman to another by the actual transfer of the pathogenic matter, either by the hands of an attendant, or the nozzle of a syringe, sponges, napkins, etc., but not by the medium of the air. To two points he drew special attention: the frequent occurrence of metria in puerperal women preyed upon by remorse or mental distress; and the occasional outbreak of a very fatal, infectious, and essentially epidemic form of metria which, he believed, could not be due to septic absorption. The influence of remorse and mental distress in predisposing to the disease was well seen in the high mortality attending puerperality in women who had been seduced; and if such cases were excluded, he thought that the mortality of the Rotunda Hospital would only amount to one-half its present rate. Here fretting and a quickened pulse were the earliest symptoms of danger, a severe form of metria manifesting itself after twenty-four hours. These cases of metria were usually due to self-inoculation, the putrid matter finding a ready inlet because of the deficient *post-partum* contraction of the uterus in such patients. Occasional outbreaks of an epidemic and very infectious form of metria were also known to occur, the disease spreading widely among the inmates of a hospital. He could not accept Dr. Evory Kennedy's explanation of these outbreaks as due to the aggregation of puerperal women, nor could he admit their septic origin, since septic material was not communicable through the air. He held, rather, that these outbreaks, occurring simultaneously with epidemics or other zymotic fevers, were really examples of these zymotics, specially modified by the physiological state of puerperal women. The infection of erysipelas could thus induce an attack of infectious metria in a puerperal woman; while, conversely, such a form of metria could impart erysipelas to her offspring. In the summary, scarlatina grafted on a puerpera might result in metria and not in scarlatina. This infectious form of metria tending to assume an epidemic character, was, therefore, to be considered as consisting of specially modified cases of the prevalent zymotic disease.

As strengthening this view, Dr. Atthill noticed the fact that, in his experience, bronchitis or pneumonia occurring in a puerperal patient was likely to be complicated by abdominal symptoms of the same kind as those which were seen in puerperal septic fever. These views he exemplified by a history of such an epi-

demie of infectious fever, occurring in the Rotunda Hospital in August last, and which, in the author's opinion, depended for its origin and infectious character upon an imported case of typhoid fever in a puerperal patient. The outbreak was completely stamped out by closing and thoroughly disinfecting the hospital for a fortnight. The severe symptoms and rapidly fatal course of this epidemic form of metria, differed essentially from the more insidious and less powerful progress of puerperal septicæmia, on the characteristics of which he dwelt at length, emphasizing the good prognostic import of a furred, as opposed to a glazed and cracked tongue, during its progress. Diarrhœa, he thought, was in such cases by no means to be considered an unmixed evil. In discussing the treatment of the different forms of metria, he observed that, while all but useless in the epidemic form, it was often of great service in the septicæmic cases.

He formulated the following conclusions as founded on his experience: 1. A disease of a highly infectious nature, differing essentially in its symptoms and course from that the result of septic poisoning, and capable of being propagated in the same manner as other zymotic diseases, occurs from time to time among puerperal women. 2. This disease originated from the introduction into the system of a puerperal woman of the infection of some well-known zymotic disease, such as erysipelas, scarlatina, typhus, and probably typhoid fever, the action of the infection being modified by the peculiar state of the system and of the blood which exists in puerperal women, and that it, therefore, develops in them an apparently totally different disease. 3. The disease thus originating can be stamped out with as great ease, and by the same means as are known to be efficacious in the case of ordinary zymotic diseases. He was satisfied, however, that the majority of cases of so-called puerperal fever are the results of septic poisoning; such form of the disease not being capable of spreading through the air.—*Brit. Med. Journal*, April 28, 1883.

Vaseline in Obstetrics.

The experiments of KOCII, in 1881, showed not only that vaseline had no antiseptic property, but that carbolic acid, when mixed with it or oil, lost the antiseptic power which it had. But if the mixture is made in the presence of water or of tissues containing water in abundance, about one-fourth of the carbolic acid is freed from the mixture and partly recovers its antiseptic properties. When carbolized oil or vaseline is carried by the exploring-finger into the vagina, a burning sensation is produced, much more intense with vaseline than with oil; this seems to prove that vaseline more readily gives up the carbolic acid than oil. In a gynecological or obstetrical examination carbolized vaseline or oil coming in contact, both with the finger of the examiner and with the tissues and secretory products of the vagina, exercises a certain degree of antiseptis, which, though slight, is sufficient if the hand of the examiner has been previously well washed with an antiseptic fluid. Carbolyzed vaseline then can only be replaced in obstetrical practice by some agent which may be preferable to it antiseptically, and at present there are no well-grounded reasons for abandoning it. Fehling claims many advantages for paraffin containing 4 parts to 100 of carbolic acid. It is ordinarily supposed that carbolic acid evaporates more readily from a solution than water, but Schüeking has shown that this is an error. In any solution containing both water and carbolic acid the water evaporates soonest.—*Centralbl. für Gynecologie*, March 10, 1883.

Vaccination during Pregnancy; its Effect in the Fœtus.

A recent number of the *Zeitschrift für Geburtschülfe und Gynäkologie* contains a laborious article by Dr. CARL BEHM, of Berlin, on the above subject.

The question whether the blood-changes wrought by vaccinia germs affect the fœtus in utero as well as the mother has been a good deal discussed on merely theoretical grounds. Bollinger formulated the doctrine that the placenta formed a kind of physiological filter by which corpuscular matters in the maternal blood were held back, and prevented from contaminating the fœtus. But since then Spitz and Albrecht have detected the spirillum of relapsing fever in the blood of the new-born infant—an observation which appears to refute the dogma of Bollinger. He has, consequently, since retracted this proposition; and, believing it possible for blood-poisons, whether corpuscular or not, to pass from the mother to the fœtus, he has stated that when a pregnant woman is successfully vaccinated the fœtus participates in the infection, and, it of course follows, in the protection conferred thereby. The same view has been taught by Gurschmann. These conclusions are supported by certain published cases in which the vaccination of children, whose mothers had been vaccinated during pregnancy, was effected without result. Isolated cases, however, prove nothing, for the failures may have been due, for instance, to bad lymph, or to unskilful performance of the operation. The most numerous observations are those of Burkhardt, who vaccinated twenty-eight pregnant women; but, of their children, in only eight was the inoculation successful. This series, however, was not tested, as it should have been, by the vaccination, with precisely the same kind of lymph and in the same manner, of children whose mothers had not been vaccinated during pregnancy. Opposed to these are observations of Gast, who vaccinated 16 mothers during pregnancy, and subsequently every one of their children, with success. This divergence in the results of experience led Dr. Behm to investigate the matter. He vaccinated 47 pregnant women, but was only able to get at the children of 33. Of these 33 mothers, 22 were vaccinated in the tenth lunar month of pregnancy, 10 in the ninth, and 1 in the eighth. In 4 the vaccination was ineffectual, in 3 of them the non-success being proved to be due to the lymph employed. In the remaining 29 pregnant women successfully vaccinated, in 7 the vesicles were not good, but in 22 the inoculation produced perfect and typical vaccine vesicles. Of the 33 children, 25 were vaccinated successfully, 8 unsuccessfully. Of these failures, 6 were (by test vaccinations on other children) shown to be due to bad lymph. In 1 of the other two the lymph used, although it produced vesicles in other children, did not produce good ones. In the remaining case, the lymph employed was good and potent. But this case, Dr. Behm remarks, ought to be tested by repeated inoculations before concluding that the non-success was due to protection acquired in utero from the vaccination of the mother. The children of the 4 mothers in whom vaccination had failed were vaccinated with perfect success. Of the remaining 21, in 15 perfect vesicles were the result; in 6 the vesicles were slightly modified, being few in number or small, but all ran a typical course. Dr. Behm therefore concludes that vaccination of the mother during pregnancy has little, if any, influence on the fœtus; but it is possible that it may sometimes protect the fœtus. He concludes with an argument for the revaccination of pregnant women, and the vaccination of infants as early as possible.—*Med. Times and Gazette*, March 10, 1883.

A Case in which Cysts in connection with both Kidneys were opened and drained, and a Tumour of the Right Ovary removed, the patient remaining in good health.

Mr. KNOWSLY THORNTON, at a meeting of the Medico-Chirurgical Society (*British Med. Journal*, May 26, 1883), reported the following very curious and interesting case:—

E. M., a single woman, aged 27, was admitted into the Samaritan Hospital in November, 1877, under the care of Mr. Spenceer Wells. She had had a child born alive at full term when she was only fifteen. When seventeen, she had inflammation of both kidneys, and from that time had been failing in health and had been unable to lie on her right side for fully a year. When admitted, she had a fluctuant tumour of considerable size in the right side of the abdomen, with a red, tender, and pointing swelling in the right loin behind this tumour. There was a smaller tumour in the left side of the abdomen, which occupied an exactly similar position to that in the right side, but did not distinctly fluctuate. There was nothing wrong with the urine, and no trouble with the bladder or kidneys, except pain across the loins and in the lower abdomen, which was not, however, constant. Menstruation was regular. The swelling in the right loin was freely incised by Mr. Wells under Listerian management, but nothing to account for its presence was found, and no communication appeared to exist between it and the kidney or ureter. It contained fluid very like that from an ovarian cyst, with an immense quantity of cholesterine. It was dressed antiseptically and drained, and in six weeks the patient went home well, all trace of the cyst having disappeared. Six or eight weeks afterwards, she had an attack of gout in both feet; then the wound opened, and a large discharge of fluid, with much cholesterine, took place, and the wound gradually healed up again. In January, 1880, she was readmitted under the author's care, with a tumour of the right ovary, for which he performed ovariectomy. While the abdomen was open, he examined the kidneys and ureters. The right kidney was large and sacculated, and its ureter was much enlarged, especially at the pelvic brim. The left kidney and ureter appeared quite normal. The recovery after the ovariectomy was rapid, but, soon after getting up, the swelling in the right loin reappeared with fever, etc., and she was obliged to return to bed. It was poulticed antiseptically until it broke, and then drained as before, and she left the hospital apparently well in three weeks from the time it burst, and about six weeks from the ovariectomy. In six weeks she returned with a swelling in the left iliac region, in the situation of the left ureter; this was opened and drained antiseptically, and again in about six weeks she went home well. Fifteen months later, the wound in the right side again opened, and discharge went on for fourteen months without apparently affecting her health at all. It had now again closed for two months, and she was in excellent health. The left side had not given any further trouble.

The Propriety of Operating in Cases of Solid Ovarian Tumours.

Mr. KNOWSLEY THORNTON in a brief but interesting article in the *Medical Times and Gazette* for April 7, 1883, states that he has performed 338 ovariectomies, and in 10, or nearly 3 per cent., he has encountered solid tumours of the ovaries, a remarkably small proportion when we consider the structure of the ovary, and the variations of blood supply and pressure to which its stroma is subjected during the performance of its physiological functions. Small as the number of these cases is, they plainly show as a group certain common features.

In all the cases menstruation was irregular. In three the menses were entirely or almost entirely suppressed from the time the tumours were noticed, though in one of these cases only one ovary was affected; in four the menstruation was regular, but affected in quantity; and in another, though regular, the pain in the tumour at this time was so excessive, that on the last occasion before the operation, she almost died in collapse; in the other two cases the menstruation was very irregular—now scanty and almost suppressed, then violent and exhausting in amount. Of course, irregular menstruation is also met with in simple

ovarian cases, but the rule with them is regularity. With the malignant cases the rule is, as we see, irregularity.

Mr. Thornton does not think that pain is more common or more severe with the solid than with the simple cystic tumours; nor is the emaciation more rapid or more marked.

The differential diagnosis most frequently required in these cases is from uterine fibroids, and the irregular menstruation helps to mislead, but the facies is usually different, especially in colour; and whereas patients are usually inclined to be robust with fibroids, and are often fat (even when excessively blanched), extreme wasting, especially about the neck, breast, and arms, is the rule with solid ovarian tumours.

Mr. Thornton thinks it will ever remain impossible to formulate any precise rule as to the wisdom of operating or not operating in cases in which solid ovarian tumour or tumours can be pretty certainly diagnosed. My experience, not only in these particular cases, but in what I have seen in the practice of others, would lead me to the opinion that the immediate danger to the patient is greater than in ordinary ovariectomies, whether complicated or uncomplicated, and this is what one would expect when he considers that the patient's general constitutional condition is already depressed, and that frequently ligatures have to be applied on and among unhealthy tissues, portions of such tissue also having sometimes to be left behind more or less damaged, and with its nutrition impaired. My own ten cases illustrate this increased immediate mortality distinctly, for three out of the ten died from the operation—a mortality triple that of my whole series of cases, six times as great as that of my recent work, and thirty times as great as that of my simple cases, in which my mortality is *nil*.

If we now pass from the consideration of the immediate danger to the question of the chances of early recurrence, my experiences are not very encouraging. Of the seven cases which survived the operation, three were very ill and recovered with difficulty, four recovered rapidly and easily. Of the three, only one remains in good health, and had a child two years after the operation; one (case 4), who was reported in good health eighteen months after the operation, is now suffering from recurrence in the abdomen; the third died, as I have stated, a few months after the operation, from pelvic recurrence. Of the four who made good recoveries, one died within the year from peritoneal recurrence, and the other three all died within the twelve months with diffuse sarcomata in various external and internal situations and in the glands. This rapid and general diffusion of sarcomata of the ovary after operations for their removal seems to me to make it extremely doubtful whether it is not a positive injustice and cruelty to the patient to operate at all, for their sufferings from the many tumours are undoubtedly greater than they would be from the ovarian growths left alone. There lives are, it is true, prolonged for a few months, but the period of actual health is very short. Still, in case 4, which appeared as hopeless as any case well could, the patient has enjoyed eighteen months of good health, much better than any she had enjoyed for years; and in the one really satisfactory case the patient not only remains well, but has become again a mother. No case could have looked more hopeless than this one did, and the tumour was of a kind in which one would have feared early recurrence. In considering the cases of patients doomed to speedy death if not operated upon, one such result as this out of ten comparative failures is not to be despised, and so I think I shall be inclined still to give the patient the chance of operation, unless there is such distinct evidence of spread of the disease into broad ligament or neighbouring parts that complete removal is out of the question.

Fibroma of the Round Ligament.

Prof. LUDWIG KLEINWÄCHTER describes, in a recent number of the *Zeitschrift für Geburtshülfe und Gynäkologie*, a case of fibroma of the round ligament, which is interesting on account of the extreme rarity of that condition. The only case which Professor Kleinwächter has been able to find is described by Winkel, and in it neither of the tumours, of which there was one on each round ligament, exceeded a bean in size. Dr. Kleinwächter's case was that of a multipara aged forty-four. The tumour reached to two fingers' breadths above the umbilicus, it caused slight pain, and was said to increase in size before and during each menstruation. The tumour was situated more to the right than to the left of the middle line, and when it was pushed upward pain was complained of in the region of the right Poupert's ligament. The uterus was pushed to the right of and behind the tumour, which filled the pelvic brim. The tumour was removed, the operation being long and difficult, owing to the number of adhesions present. The clamp was applied to the pedicle, and two drainage-tubes inserted. The patient died from peritonitis on the third day. On autopsy, both ovaries and tubes were found healthy, and the pedicle of the tumour was situated on the left round ligament, about an inch from its origin. The uterus was enlarged, but the nature of the enlargement is not stated. The tumour was solid, fibrous in structure, and weighed about three pounds and a half. Looking at the rarity of this disease of the round ligament, the numerous adhesions present, and the uterine enlargement, it might be suggested, and it is to be regretted that Professor Kleinwächter does not discuss the point, that the tumour was originally a uterine fibroid which had become united by adhesions to the round ligament, and subsequently severed from its old attachment.—*Med. Times and Gaz.*, April 28, 1883.

The Sharp Spoon in Gynaecology.

A recent number of the *Archiv für Gynäkologie* contains an excellent article by Dr. v. WECKBECKER-STERNEFELD, of Munich, on the use of the sharp spoon in gynaecology. This writer's statements are based upon experience, for he gives a table and careful analysis of one hundred cases in which he has used the instrument which he recommends. In this absence of haste it would be well if his example were more generally followed; for we have known instruments exhibited, and lines of practice laid down, by men who had never once used their instruments, or seen a case calling for the practice they write about. The cases in which Dr. v. Weckbecker-Sternefeld advises the use of the sharp spoon (which, we may mention, is that known as Simon's) are these: In abortion, when the ovum or membranes, or part of them, are from any cause retained in utero; in cases of mole, vesicular or fleshy; after labour, in cases of hemorrhage or fetid discharges, caused by retention of bits of placenta or membranes, or polypoid growths at the placental site. The advantages of the sharp spoon (as compared with the digital detachment and removal of such offending bodies), he thinks, are these: avoidance of septic infection; the small space required for its use; the completeness with which detached bodies can be removed in the hollow of the spoon; the almost painlessness of the proceeding for the patient; the absence of dragging upon the uterus; and the unirritating character of the proceeding. The instrument is used, of course, in the same way as the curette; it may, in fact, be regarded as a large curette, so shaped as to be capable not merely of detaching, but of bringing away any mass loosely attached to the uterine wall. The size of spoon which Dr. v. Weckbecker-Sternefeld finds most generally useful is about an inch long by rather more than half an inch across. The angle at which the

spoon is set on the handle matters little, but it is convenient to have the direction of the convexity and concavity of the spoon indicated by marks on the handle. Its use does not give pain enough to make anæsthesia necessary. Our author, as we have mentioned, gives a careful analysis of one hundred cases in which he has used the sharp spoon. Of these, in nine it was employed for the removal of an ovum in process of expulsion; in thirty-one for removal of membranes, or portions of them, after the embryo had been discharged; in twenty-seven, for removal of placenta, or portions of it, after premature delivery; in twenty-eight, for the same purpose after delivery at term; in two, for atony of the uterus post-partum; and in the others, for endometritis, deciduoma at the placental site, placental polypus, fleshy and hydatid mole. Of the one hundred cases five died; three from puerperal septicæmia existing before the operation was undertaken, one from enteric fever, one from peritonitis. The last mentioned our author considers the only one in which the fatal result could be connected with the operation, but in this there was also some disease of the rectum, and a previous attempt had been made to effect manually the object for which the spoon was used. In most cases no bad symptoms followed, and the patients quickly recovered.—*Medical Times and Gazette*, May 19, 1883.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

Intra-Peritoneal Injections in Cases of Poisoning.

Dr. WM. MURRELL says, in regard to Dr. Ringer's suggestion of the injection of saline solutions in cases of poisoning, it is generally supposed that the introduction of fluids into the peritoneal cavity is an operation attended with considerable risk, but the experimental observations of Ponfick and of Bizzozero and Golgi have shown that defibrinated blood can be injected into the abdomen with little or no danger. Ponfick relates that in one case 250 grammes of blood were transfused, in another 350, and in a third 220 grammes. The results were most satisfactory, the only unfavourable symptoms being a little tenderness of the abdomen and a slight and transitory elevation of temperature.

Recently, I have had occasion to resort to intra-peritoneal injection six times, and in four instances I have used Ringer's solution with much benefit. The only apparatus employed was the canula of the aspirator, attached to a piece of India-rubber tubing, the fluid, warm to the temperature of the body, being allowed to run in by siphon action. The canula was pushed through the abdominal wall on one side, no special antiseptic precautions being taken. The first injection measured 500cc., or about fifteen ounces, the second half that quantity, and the third 600cc. In a case of peritonitis in a child, serous fluid to the amount of 320cc. was drawn off by the aspirator, and the peritoneum was then washed out with 400cc. of the salt solution. The temperature on the following day rose to 102°, but with this exception there were no unfavourable symptoms.

In cases of emergency it may not be practicable to prepare Ringer's solution in exact accordance with his directions; but the following formula, which is almost identical with that recommended by him, can be quickly dispensed: Common salt, one drachm; bicarbonate of soda, four grains; chloride of calcium, three grains; chloride of potassium, one grain; water, twenty ounces, at a temperature of 100° Fahr. This may be used either for intra-venous or intra-peritoneal injection.—*Lancet*, April 21, 1883.

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 WILLIAM L. RICHARDSON, M.D., Assistant Professor of Obstetrics.
 THOMAS DWIGHT, M.D., Instructor in Topographical Anatomy and Histology.
 EDWARD S. WOOD, M.D., Professor of Chemistry.
 WILLIAM H. BAKER, M.D., Assistant Professor of Gynecology.
 WILLIAM B. HILLS, M.D., Instructor in Chemistry.
 WILLIAM F. WHITNEY, M.D., Curator of the Anatomical Museum.

OTHER INSTRUCTORS.

FRANK W. DRAPER, M.D., Lecturer on Forensic Medicine.
 HENRY P. QUINCY, M.D., Assistant in Histology.
 EDWARD N. WHITTIER, M.D., Instructor in the Theory and Practice of Physic.
 FRANCIS A. HARRIS, M.D., Demonstrator of Medico-legal Examinations.
 WILLIAM P. BOLLES, M.D., Instructor in Materia Medica.
 EDWARD H. BRADFORD, M.D., Assistant in Clinical Surgery.
 W. STURGIS BIGELOW, M.D., Assistant in Surgery.
 FRANCIS H. DAVENPORT, M.D., Assistant in Gynecology.
 GEORGE M. GARLAND, M.D., Assistant in Clinical Medicine.
 JOSEPH W. WARREN, M.D., Assistant in Physiology.
 MAURICE H. RICHARDSON, M.D., Demonstrator of Anatomy.
 WILLIAM W. GANNETT, M.D., Assistant in Pathological Anatomy.
 CHARLES S. MINOT, M.D., Lecturer on Embryology.
 WILLIAM C. EMERSON, M.D., Assistant in Chemistry.
 WALTER J. OTIS, M.D., Assistant in Anatomy.
 SAMUEL J. MIXTER, M.D., Assistant in Anatomy.

The following gentlemen will give special clinical instruction:—

JOHN HOMANS, M.D., in the Diagnosis and Treatment of Ovarian Tumors.
 FRANCIS B. GREENOUGH, M.D., and ABNER POST, M.D., in Syphilis.
 OLIVER F. WADSWORTH, M.D., in Ophthalmoscopy.
 J. ORNE GREEN, M.D., and CLARENCE J. BLAKE, M.D., in Otology.
 AMOS L. MASON, M.D., and FRED C. SHATTUCK, M.D., in Auscultation.
 JOSEPH P. OLIVER, M.D., and THOMAS M. ROTCH, M.D., in Diseases of Children.
 SAMUEL G. WEBBER, M.D., and JAMES J. PUTNAM, M.D., in Diseases of the Nervous System.
 JAMES R. CHADWICK, M.D., in Gynecology.

The New Building, just completed at a cost of more than a quarter of a million of dollars, will be opened for use in September. Its numerous apartments are spacious, well lighted, and provided with carefully contrived apparatus for heating and ventilation. The comfort and convenience of the students have been constantly borne in mind in the arrangement of rooms, the construction of

seats, and in the furnishing of the various laboratories, halls for lectures, and rooms for recitations, study, and conversation. The building is devoted to laboratory instruction and didactic teaching, while the general and special clinics take place at the various hospitals and dispensaries. Greatly enlarged and improved facilities will be offered at the Massachusetts General Hospital and the Boston Dispensary, both of which institutions are now constructing buildings to meet the constantly increasing demands for their usefulness.

All candidates for admission who hold a degree in arts or science, must pass a written examination on entrance to this School, in English, Latin, Physics, and any one of the following subjects: French, German, Elements of Algebra or of Plane Geometry, Botany. The admission examination for 1883-84 will be held June 23, at Boston; June 25th, at Exeter, New York, Philadelphia, Chicago, Cincinnati, and San Francisco; on September 24th, at Boston only.

Instruction is given by lectures, recitations, clinical teaching, and practical exercises, distributed throughout the academic year. In the subjects of anatomy, histology, chemistry, and pathological anatomy, laboratory work is largely substituted for, or added to, the usual methods of instruction. The year begins September 27, 1883, and ends on the last Wednesday in June, 1884, and is divided into two equal terms.

Students are divided into four classes, according to their time of study and proficiency, and during their last year will receive largely increased opportunities for instruction in the special branches mentioned. Students who began their professional studies elsewhere may be admitted to advanced standing; but all persons who apply for admission to the advanced classes must pass an examination in the branches already pursued by the class to which they seek admission.

Although the course of study recommended by the Faculty covers four years, until further notice the degree of Doctor of Medicine will continue to be given upon the completion of three years of study, to be as ample and full as heretofore. The degree of Doctor of Medicine *cum laude* will be given to candidates who have pursued a complete four years' course, and obtained an average of 75 per cent. upon all the examinations of this course. In addition to the ordinary degree of Doctor of Medicine as heretofore obtained, a certificate of attendance on the studies of the fourth year will be given to such students desiring it as shall have attended the course, and have passed a satisfactory examination in the studies of the same.

ORDER OF STUDIES.—FOUR YEARS' COURSE.

For the First Year.—Anatomy, Physiology, and General Chemistry.

For the Second Year.—Practical and Topographical Anatomy, Medical Chemistry, Materia Medica, Pathological Anatomy, Clinical Medicine, Surgery, and Clinical Surgery.

For the Third Year.—Therapeutics, Obstetrics, Theory and Practice of Medicine, Clinical Medicine, Surgery, and Clinical Surgery.

For the Fourth Year.—Ophthalmology, Otolaryngology, Syphilis, Laryngology, Mental Diseases, Diseases of the Nervous System, Diseases of Women, Diseases of Children, Obstetrics, Clinical and Operative Obstetrics, Clinical Medicine, Clinical and Operative Surgery, Forensic Medicine.

THREE YEARS' COURSE.

For the First Year.—Anatomy, Physiology, and General Chemistry.

For the Second Year.—Practical and Topographical Anatomy, Medical Chemistry, Materia Medica, Pathological Anatomy, Clinical Medicine, and Clinical Surgery.

For the Third Year.—Therapeutics, Obstetrics, Theory and Practice of Medicine, Clinical Medicine, Surgery, Clinical Surgery, Ophthalmology, Dermatology, Syphilis, Otolaryngology, Mental Diseases, Diseases of the Nervous System, Diseases of Women, Diseases of Children, Forensic Medicine.

ANNUAL EXAMINATIONS.

At the end of the first year—Anatomy, Physiology, and General Chemistry.

End of second year—Topographical Anatomy, Medical Chemistry, Materia Medica, and Pathological Anatomy.

End of third year—Therapeutics, Obstetrics, Theory and Practice of Medicine, Surgery (Students of the three years' course are also examined in Clinical Medicine and Clinical Surgery.)

End of fourth year—Ophthalmology, Otolaryngology, Syphilis, Laryngology, Mental Diseases, Diseases of the Nervous System, Diseases of Women, Diseases of Children, Obstetrics, Clinical and Operative Obstetrics, Clinical Medicine, Clinical and Operative Surgery, Forensic Medicine.

Examinations in all subjects are also held before the opening of the School, beginning September 26th.

REQUIREMENTS FOR A DEGREE.—Every candidate must be twenty-one years of age; must have studied medicine three or four full years, have spent at least one continuous year at this school, have passed a written examination upon all the proscribed studies of the course taken, and have presented a thesis.

COURSE FOR GRADUATES.—For the purpose of affording to those already Graduates of Medicine additional facilities for pursuing clinical, laboratory, and other studies, the Faculty has established a course which comprises all of the special subjects of the fourth year in addition to private instruction in Histology, Physiology, Medical Chemistry, and Pathological Anatomy. Any or all branches may be pursued. If the full fee is paid, the privilege of attending any of the other exercises of the Medical School, the use of the laboratories and library, and all other rights accorded by the University will be granted. Graduates of other Medical Schools who may desire to obtain the degree of M.D. at this University, will be admitted to examination for this degree after a year's study in the Graduates' Course. Examination on entrance not required.

FEES.—For Matriculation, \$5; for the Year, \$200; for one Term alone, \$120; for Graduation, \$30. For Graduates' Course, the fee for one year is \$200; for one Term, \$120; and for single courses such fees as are specified in the Catalogue. Payment in advance, or if a bond is filed, at the end of the term.

Students in regular standing in any one department of Harvard University are admitted free to the lectures, recitations, and examinations of other departments.

For further information, or Catalogue, with an illustrated description of the New Building, address

DR. R. H. FITZ, Secretary,
18 Arlington St., Boston, Mass.

UNIVERSITY OF THE CITY OF NEW YORK, MEDICAL DEPARTMENT.

410 East Twenty-sixth St., opp. Bellevue Hospital, New York City.

FORTY-THIRD SESSION, 1883-84.

FACULTY OF MEDICINE.

REV. JOHN HALL, D.D., LL.D., *Chancellor of the University, pro tem.*

- | | |
|--|---|
| ALFRED C. POST, M.D., LL.D., Professor Emeritus of Clinical Surgery; President of the Faculty. | WM. M. Polk, M.D., Professor of Obstetrics and the Diseases of Women and Children; Gynecologist to Bellevue Hospital. |
| CHARLES INSLEE PARDEE, M.D., Dean of the Faculty; Professor of Otolaryngology; Surgeon to the Manhattan Eye and Ear Hospital. | LEWIS A. STIMSON, M.D., Professor of Physiology and Physiological Anatomy; Surgeon to Bellevue Hospital; Curator to Bellevue Hospital. |
| J. W. S. ARNOLD, M.D., Emeritus Professor of Physiology and Histology. | FANEUIL D. WEISSE, M.D., Professor of Practical and Surgical Anatomy; Surgeon to Workhouse Hospital, B. I. |
| JOHN C. DRAPER, M.D., LL.D., Professor of Chemistry. | STEPHEN SMITH, M.D., Professor of Clinical Surgery; Surgeon to Bellevue Hospital. |
| ALFRED L. LOOMIS, M.D., Professor of Pathology and Practice of Medicine; Visiting Physician to Bellevue Hospital. | A. E. MACDONALD, LL.B., M.D., Professor of Medical Jurisprudence and Diseases of the Mind; Medical Superintendent of the New York City Asylum for the Insane. |
| WM. DARLING, M.D., LL.D., F.R.C.S., Professor of General and Descriptive Anatomy. | R. A. WITTHAUS, M.D., Professor of Physiological Chemistry. |
| WILLIAM H. THOMSON, M.D., Professor of Materia Medica, Therapeutics and Diseases of the Nervous System; Visiting Physician to Bellevue Hospital. | HERMAN KNAPP, M.D., Professor of Ophthalmology; Surgeon to the Ophthalmic Institute. |
| J. WILLISTON WRIGHT, M.D., Professor of Surgery; Visiting Surgeon to Bellevue Hospital. | AMBROSE L. RANNEY, M.D., Curator of Museum. |
| | JOSEPH E. WINTERS, M.D., Demonstrator of Anatomy. |

ADJUNCT LECTURERS.

- | | |
|--|--|
| F. R. S. DRAKE, M.D., Clinical Lecturer on Practice of Medicine; Visiting Physician to Bellevue Hospital. | JOSEPH E. WINTON, M.D., Clinical Lecturer on Diseases of Children. |
| N. M. SHAFFER, M.D., Clinical Lecturer on Orthopedic Surgery; Surgeon in Charge of the N. Y. Orthopaedic Hospital. | WILLIAM C. JARVIS, M.D., Clinical Lecturer on Laryngology. |
| P. A. MORROW, M.D. Clinical Lecturer on Dermatology. | LAWRENCE JOHNSON, M.D., Lecturer on Medical Botany. |

THE PRELIMINARY SESSION will begin on Wednesday, September 19, 1883, and end October 3, 1883. It will be conducted on the same plan as the Regular Winter Session.

THE REGULAR WINTER SESSION will begin October 3, 1883, and end about the middle of March, 1884. The Plan of Instruction consists of Didactic and Clinical Lectures, recitations and laboratory work in all subjects in which it is practicable. To put the Laboratories on a proper footing a new building has been erected at an expense of thirty-five thousand dollars. It will contain laboratories fitted for instruction in Chemistry, Histology, Pathology, Materia Medica, Operative Surgery and Gynecology.

Two to five Didactic lectures and two or more Clinical lectures will be given each day by members of the Faculty. In addition to the ordinary clinics, *special clinical instruction*, WITHOUT ADDITIONAL EXPENSE will be given to the candidates for graduation during the whole Regular Session. For this purpose the candidates will be divided into sections of twenty-five members each. At these special clinics students will have excellent opportunities to make and verify diagnoses, and watch the effects of treatment. They will be held in the Wards of the Hospitals and at the Public and College Dispensaries.

Each of the seven professors of the Regular Faculty will conduct a recitation on his subject one evening each week. Students are thus enabled to make up for lost lectures, and prepare themselves properly for their final examinations without additional expense.

THE SPRING SESSION will begin about the middle of March and end the last week in May. The daily Clinics and Special Practical Courses will be the same as in the Winter Session, and there will be Lectures on Special Subjects by the Members of the Faculty. It is supplementary to the Regular Winter Session. Nine months of continued instruction are thus secured to all students of the University who desire a thorough course.

FEES.

For course of Lectures.....	\$140 00
Matriculation	5 00
Demonstrator's Fee, including material for dissection.....	10 00
Final Examination Fee.....	30 00

For further particulars and circulars address the Dean,

PROF. CHAS. INSLEE PARDEE, M.D.,
University Medical College, 410 East 26th St., New York City.

MEDICAL DEPARTMENT OF THE UNIVERSITY OF LOUISIANA—NEW ORLEANS.

FACULTY.

T. G. RICHARDSON, M.D.,
Professor of General and Clinical Surgery.

SAMUEL M. BEMISS, M.D.,
Professor of the Theory and Practice of
Medicine and Clinical Medicine.

STANFORD E. CHAILLE, M.D.,
Prof. of Physiology and Patholog. Anatomy.

JOSEPH JONES, M.D.,
Prof. of Chemistry and Clinical Medicine.

SAMUEL LOGAN, M.D.,
Professor of Anatomy and Clinical Surgery.

ERNEST S. LEWIS, M.D.,
Professor of General and Clinical Obstetrics
and Diseases of Women and Children.

JOHN B. ELLIOTT, M.D.,
Professor of Materia Medica and
Therapeutics and Hygiene.

Lecturer on Diseases of the Eye.

ALBERT B. MILES, M.D.,
Demonstrator of Anatomy.

The next annual course of instruction in this Department (now in the fiftieth year of its existence) will commence on Monday, the 22d day of October, 1883, and terminate on Saturday the 29th day of March, 1884. The first four weeks of the term will be devoted exclusively to Clinical Medicine and Surgery at the Charity Hospital: Practical Chemistry in the Laboratory; and dissections in the spacious and airy Anatomical Rooms of the University.

The means of teaching now at the command of the Faculty are unsurpassed in the United States. Special attention is called to the opportunities presented for

CLINICAL INSTRUCTION.

The Act establishing the University of Louisiana gives the professors of the Medical Department the use of the great Charity Hospital, as a school of practical instruction.

The Charity Hospital contains nearly 700 beds, and received, during the last year, nearly six thousand patients. Its advantages for practical study are unsurpassed by any similar institution in this country. The Medical, Surgical, and Obstetrical Wards are visited by the respective Professors in charge daily, from eight to ten o'clock A. M., at which time all the Students are expected to attend, and familiarize themselves, AT THE BEDSIDE OF THE PATIENTS, with the diagnosis and treatment of all forms of injury and disease.

The regular lectures at the hospital, on Clinical Medicine by Professors Bemiss and Joseph Jones. Surgery by Professors Richardson and Logan, Diseases of Women and Children by Professor Lewis, and Special Pathological Anatomy by Professor Chaille, will be delivered in the amphitheatre on Monday, Wednesday, Thursday and Saturday, from 10 to 12 o'clock, A. M.

The Administrators of the Hospital elect, annually, after competitive examination, FOURTEEN RESIDENT STUDENTS, who are maintained by the Institution.

TERMS.

For the Tickets of all the Professors	.	.	.	.	\$140 00
For the Ticket of Practical Anatomy	.	.	.	.	10 00
Matriculation Fee	.	.	.	.	5 00
Graduation Fees	.	.	.	.	30 00

Candidates for graduates are required to be twenty-one years of age; to have studied three years: to have attended two courses of lectures, and to pass a satisfactory examination.*

Graduates of other respectable schools are admitted upon payment of the Matriculation and half lecture fees. They cannot, however, obtain the Diploma of the University without passing the regular examination and paying the usual Graduation Fee.

As the practical advantages here afforded for a thorough acquaintance with all the branches of medicine and surgery are QUITE EQUAL to those possessed by the schools of New York and Philadelphia, the same fees are charged.

For further information, address

T. G. RICHARDSON, M.D., *Dean.*

* For further information upon these points see circular.

BELLEVUE HOSPITAL MEDICAL COLLEGE, CITY OF NEW YORK.

SESSIONS OF 1883-84.

The standard of Medical Ethics recognized by the College is embodied in the Code of Ethics of the American Medical Association.

The COLLEGIATE YEAR embraces the Regular Winter Session and a Spring Session. The REGULAR SESSION begins on Wednesday, September 19, 1883, and ends about the middle of March, 1884. During this Session, in addition to the regular didactic lectures, two or three hours are daily allotted to clinical instruction. Attendance upon two regular courses of lectures is required for graduation. The SPRING SESSION consists chiefly of recitations from Text-Books. This Session begins about the middle of March, and continues until the middle of June. During this Session, daily recitations in all the departments are held by a corps of Examiners appointed by the Faculty. Short courses of lectures are given on special subjects, and regular clinics are held in the Hospital and in the College building.

FACULTY.

ISAAC E. TAYLOR, M.D.,

Emeritus Prof. of Obstetrics and Diseases of Women and Children, and President of the Faculty.

FORDYCE BARKER, M.D., LL.D.,

Professor of Clinical Midwifery and Diseases of Women.

AUSTIN FLINT, M.D., LL.D.,

Prof. of the Principles and Practice of Medicine, and Clinical Medicine.

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Professor of Principles and Practice of Surgery and Clinical Surgery.

LEWIS A. SAYRE, M.D.,

Professor of Orthopedic Surgery and Clinical Surgery.

ALEXANDER B. MOTT, M.D.,

Professor of Clinical and Operative Surgery.

WILLIAM T. LUSK, M.D.,

Professor of Obstetrics and Diseases of Women and Children, and Clinical Midwifery.

BENJAMIN W. MCCREADY, M.D.,

Emeritus Professor of Materia Medica and Therapeutics.

A. A. SMITH, M.D.,

Professor of Materia Medica and Therapeutics, and Clinical Medicine.

AUSTIN FLINT, JR., M.D.,

Professor of Physiology and Physiological Anatomy, and Secretary of the Faculty.

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R. OGDEN DOREMUS, M.D., LL.D.,

Professor of Chemistry and Toxicology.

EDWARD G. JANEWAY, M.D.,

Prof. of Diseases of the Nervous System, and Clinical Medicine, and Associate Professor of Principles and Practice of Medicine.

PROFESSORS OF SPECIAL DEPARTMENTS, Etc.

HENRY D. NOYES, M.D.,

Professor of Ophthalmology and Otolary.

EDWARD L. KEYES, M.D.,

Prof. of Cutaneous and Genito-Urinary Diseases.

JOHN P. GRAY, M.D., LL.D.,

Professor of Psychological Medicine and Medical Jurisprudence.

WILLIAM H. WELCH, M.D.,

Professor of Pathological Anatomy and General Pathology.

J. LEWIS SMITH, M.D.,

Clinical Professor of Diseases of Children.

BEVERLY ROBINSON, M.D.,

Clinical Professor of Medicine.

FRANCIS H. BOSWORTH, M.D.,

Professor of Diseases of the Throat.

CHARLES A. DOREMUS, M.D., Ph.D.,

Professor Adjunct to the Chair of Chemistry and Toxicology.

WILLIAM H. WELCH, M.D.,

Demonstrator of Anatomy.

FEES FOR THE REGULAR SESSION.

Fees for Tickets to all the Lectures, Clinical and Didactic	\$140 00
Fees for Students who have attended two full courses at other Medical Colleges, and } for Graduates of other Medical Colleges	70 00
Matriculation Fee	5 00
Dissection Fee (including material for dissection)	10 00
Graduation Fee	30 00
No Fees for Lectures are required of third-course Students who have attended their second course at the Bellevue Hospital Medical College.	

FEES FOR THE SPRING SESSION.

Matriculation (Ticket valid for the following Winter)	\$5 00
Recitations, Clinics and Lectures	40 00
Dissection (Ticket valid for the following Winter)	10 00

For the Annual Circular and Catalogue, giving regulations for graduation and other information, address Prof. AUSTIN FLINT, JR., Secretary, Bellevue Hospital Medical College.

CHICAGO MEDICAL COLLEGE.

MEDICAL DEPARTMENT OF THE NORTHWESTERN UNIVERSITY.

SESSIONS OF 1883-4.

H. A. JOHNSON, A.M., M.D.,
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Practice of Medicine and Clinical Medicine.

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Professor of Principles and Practice of
Medicine and of Clinical Medicine.

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Professor of Clinical Surgery.

RALPH N. ISHAM, M.D.,
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E. O. F. ROLER, A.M., M.D.,
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SAMUEL J. JONES, A.M., M.D.,
Professor of Ophthalmology and Otology.

J. H. HOLLISTER, M.D.,
Professor of Clinical Medicine.

J. S. JEWELL, A.M., M.D.,
Professor of Nervous and Mental Diseases.

MARCUS P. HATFIELD, A.M., M.D.,
Professor of Diseases of Children.

LESTER CURTIS, A.M., M.D.,
Professor of Histology.

HENRY GRADLE, M.D.,
Professor of Physiology.

E. C. DUDLEY, A.M., M.D.,
Professor of Gynecology.

JOHN E. OWENS, M.D.,
Professor of Surgical Anatomy and
Operations of Surgery.

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Professor of State Medicine and Hygiene.

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WALTER HAY, M.D., LL.D.,
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Therapeutics.

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Anatomy.

I. N. DANFORTH, A.M., M.D.,
Professor of Clinical Medicine.

A. G. PAINE, M.D.,
Lecturer on Dermatology.

FRANK BILLINGS, M.D.,
Demonstrator of Anatomy.

The Collegiate Year in this Institution consists of a REGULAR AUTUMN AND WINTER SESSION, and a special SESSION FOR PRACTITIONERS. THE REGULAR SESSION begins September 25, 1883, and closes March 25, 1884.

This College was the first in the United States to adopt a graded system of instruction. All applicants for admission must possess at least a good English education, and present full evidence of the same. If an applicant has received the degree of A.B., or presents a certificate from some reputable Scientific School, High School, or Academy, no matriculation examination will be required; otherwise he must sustain a satisfactory examination before a committee of the Faculty. The students are divided into 1st Year, 2d Year, and 3d Year CLASSES, instructions being given simultaneously in different lecture rooms.

The Clinical advantages of this College, with the great number of Dispensary, College Clinic and Hospital patients, cannot be surpassed. All professors of practical branches are members of the staff of Mercy or Cook County Hospital, or other charities. For several sessions each senior student has had the privilege of attending upon one or more obstetrical cases, and of witnessing important obstetrical operations.

It is the aim of the Faculty to make all instruction in the College pre-eminently practical.

THE PRACTITIONERS' COURSE, designed for Practising Physicians only, was inaugurated in 1880. It has proven so satisfactory to all concerned that it will be continued and constitute a portion of each Collegiate year. This course will begin the day following the public Commencement exercises, and continue for four weeks, affording, by means of didactic and daily clinical instruction, special advantages to physicians for a rapid, yet thorough, practical review of the most important subjects in Medicine and Surgery.

FEES FOR COLLEGIATE YEAR (except Practitioners' Course), \$75. Registration Fee, \$5. Demonstrator's Ticket, \$5. Laboratory Ticket, \$5. Mercy Hospital Ticket, \$6. Final Examination Fee, \$30. For Practitioners' Course, including Laboratory, Anatomical, and Hospital Tickets, \$30.

For the Annual Announcement and Catalogue, or for any information relating to the College, address

N. S. DAVIS, M.D., LL.D.,

65 Randolph St., Chicago, Ill.

THE
AMERICAN JOURNAL
OF THE MEDICAL SCIENCES
FOR OCTOBER, 1883.

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JAMES L. MINOR, M.D., *Asst. Surgeon to the New York Eye and Ear Infirmary.*
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JAMES C. WHITE, M.D., *Professor of Dermatology in Harvard University.*
HIRAM WOODS, M.D., *House Physician of Bay View Asylum, Baltimore.*

TO READERS AND CORRESPONDENTS.

ALL communications intended for insertion in the Original Department of this Journal are only received for consideration with the distinct understanding that they are sent for publication to this Journal alone, and that abstracts of them shall only appear elsewhere subsequently, and with due credit. Gentlemen favouring us with their communications are considered to be bound in honour to a strict observance of this understanding.

Contributors who wish their articles to appear in the next number are requested to forward them before the 1st of November.

Liberal compensation is made for all articles used. Extra copies, in pamphlet form with cover, will be furnished to authors in lieu of compensation, *provided the request for them be made at the time the communication is sent to the Editor.*

The following works have been received for review:—

Zur Entstehung und Behandlung der Scrophulose und der Scrophulösen Erkrankungen der Sinnorgane. Von Dr. O. PAULSEN, von Hamburg. Berlin, 1883.

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ARTICLE I.

ON CERTAIN ABSCESSSES OF THE NECK WHICH MAY CAUSE SUDDEN DEATH,
AND HOW TO TREAT THEM WITH SUCCESS. By JOHN A. LIDELL, A.M.,
M.D., of New York, late Surgeon to Bellevue Hospital, etc.

MANY years ago, an example of very sudden death, which resulted from a small and seemingly a circumscribed abscess of the connective tissue that had been rather rapidly developed underneath the left sterno-cleido-mastoid muscle, came under my notice and impressed me so strongly at the time, that its remembrance has never become effaced, nor even much impaired. This example I have long intended to record in a permanent form, but circumstances, which it is now unnecessary to mention, have hitherto prevented. However, I shall proceed without any further delay to execute this ancient purpose.

My attention was first called to the case on Sunday morning, July 24, 1864, at the usual weekly inspection of Stanton Military Hospital (which was then under my charge), by Dr. John B. Garland, Acting Assistant Surgeon U. S. Army, who had the immediate care of the young man who was the patient. He was sitting in a chair at the time, beside the head of his bed, in Ward No. 5; but, when I approached him, he immediately arose and gave the usual military salute, without showing any sign of physical weakness. His countenance was rather pale; but it did not appear to be emaciated, nor indicative of any particular suffering or disease. There was, however, a tumefaction plainly visible on the left side of his throat, first noticed only three days before, that was increasing steadily and rather rapidly, which made Dr. Garland somewhat anxious about the case, and desirous of my advice, especially in regard to the nature or diag-

nosis of the tumefaction itself. His neck was stiff, and his head twisted somewhat toward the opposite side. Proceeding now to examine the patient manually (chirurgically), I found on the left front of his neck, at the level of the *ponum Adami*, a pretty firm and well-rounded, but not movable swelling, about the size of a small lemon, which was deeply seated, being apparently in or near the track of the great cervical bloodvessels and pneumogastric nerve of that side, and obviously covered by the *sterno-cleido-mastoid* muscle, as well as by the common integument, etc. It exhibited an obscure deeply-seated fluctuation, but was entirely destitute of pulsation; it also exhibited some tenderness (soreness) under pressure.

As to the young man's previous history, I was briefly informed that he had been admitted into the hospital somewhat over two months previously for a gonorrhœa, which had readily yielded to the treatment employed; that, while waiting in the hospital to regain his strength, he had been attacked with *cynanche tonsillaris* and malarial fever, which proved rather obstinate, but finally they were overcome; and that, while he was convalescing from these disorders, diarrhœa supervened, and was followed by the tumefaction mentioned above, which first presented itself, in company with some soreness and stiffness of the affected parts, three days before, as already stated. I was also informed that there had not been any cutaneous eruption in the history of the case, nor any osteocopes, nor any enlargement of the lymphatic ganglia in the neck, groins, elbows, or any other part, although it had been repeatedly and carefully sought for. There certainly was no sign of syphilis discernible when I saw him. Finally, I concluded that the swelling on the left front of his neck was an abscess formed in the deep connective tissue of his neck, and firmly bound down by the reduplications of the deep cervical fasciæ, which should be promptly opened and evacuated by making an external incision; but, as there was not much dysphagia, and no dyspnoea whatever, as well as not even the slightest symptom apparent indicating any urgency for the immediate employment of this procedure, and, moreover, being myself much pressed for time by reason of the inspection then in hand, I unwittingly postponed the operation of incising it until the following morning. Indeed, the patient expressed himself in reply to my inquiry as feeling quite comfortable; and certainly there was nothing whatever to be seen among the objective signs which could lead one to suspect that a fatal issue of the case might be very close at hand. That evening, however, I was surprised and shocked on learning that the patient had suddenly expired in the afternoon, from asphyxia caused by a tight closure of the *rima glottidis*, without the appearance of any warning symptoms, and before the officer of the day could be brought to him.

With good reason, then, Dr. Garland had exhibited unusual anxiety concerning his patient's welfare; not only because, as he said, the man had been in the hospital somewhat over two months, firstly for gonorrhœa,

next for tonsillitis, ulcerated sore-throat, and malarial fever, then for diarrhœa, and finally a deep-seated abscess in the neck had suddenly supervened, but likewise because of the unexpected consequences of this abscess.

This case was so tragic and surprising in its issue, as well as so widely different from the general run of abscesses, and likewise presented so many features worthy of special mention, that I requested Dr. G. to furnish me with all the particulars, as far as possible, which would serve to throw any light upon it, and with this request he promptly complied. I herewith present his report of the case unabridged, lest by condensing his account thereof, I should in any respect impair its value for future investigators, or weaken the lessons which it obviously inculcates.

CASE I.—Private Albert J., aged 18 years, belonging to the Signal Corps, was admitted into Stanton Hospital May 21, 1864, with gonorrhœa; health otherwise apparently good; he had neither sores nor swellings on any part of his person.

May 22. Ordered magnesia sulphat. $\mathfrak{z}\text{j}$; to be followed by the following mixture:—

R.—Copaibæ balsami,
Spt. æther. nitros., $\text{āā } \mathfrak{z}\text{j}$.
Liquoris potassæ, $\mathfrak{z}\text{ij}$.
Spt. lavendulæ comp. $\mathfrak{z}\text{ij}$.
Syrupi acaciæ, $\mathfrak{z}\text{vj}$.—M.

Sig. One tablespoonful three times per day; wash frequently the parts in cold water; low diet, and rest in bed.

28th. Renew the gonorrhœa mixture; also R. Zinei sulphat. gr. viij, aquæ $\mathfrak{z}\text{iv}$. M. S. Use this as an injection twice or three times per day. The discharge has ceased, but medication is to be continued for better security.

June 2. He has been ordered to do duty in the hospital wards, etc. Considering the patient as cured, and not hearing anything further from him, I lost sight of him from this time, and until I again found him in bed, on June 22, complaining of a sore throat. Upon examination, I found him free from gonorrhœa and with nothing to indicate a syphilitic taint. He is perfectly free from sores and swellings of every kind, whether glandular or otherwise, except a general inflamed condition of the fauces, tonsils, etc.; has cough, fever, and some difficulty of respiration; has had a chill; complains of no pain. R. Quiniæ sulph. gr. vj, three times per day; a Seidlitz powder every hour until it operates freely; apply ice to throat; and use for a gargle, R. Argent. nitrat. gr. viij, aquæ $\mathfrak{z}\text{iiij}$, syrupi simplicis $\mathfrak{z}\text{j}$, M., three times per day.

23d. Continue the quinine and gargle, with ice to throat.

24th. General condition better; chills have stopped; throat, however, continues sore; cough, supposed to result from faucial irritation, still troublesome. Continue quinine and the gargle, with ice to throat.

25th. Treatment to be continued unchanged.

26th. The left tonsil has become ulcerated. Excepting difficulty of deglutition, the patient appears to be a little better. He says he would eat if he could swallow. Touched the tonsillar ulcers with caustic (argenti nitras); ordered R. Potassæ chlorat. $\mathfrak{z}\text{ss}$, syrupi simplicis $\mathfrak{z}\text{j}$, aquæ $\mathfrak{z}\text{iiij}$. M. Ft. gargarisma. To be used three or four times per day. Also, magnesia sulphat. $\mathfrak{z}\text{ss}$, to be repeated if the bowels do not move in three

hours. His food to consist of animal broths or soups, milk, soft-boiled eggs, custards, or any nourishing fluid food he will or can swallow.

July 1st. The patient's general condition is fair, with the exception of sloughing about the tonsils and parts adjacent thereto. R. Potass. nitrat. ʒss; ol. olivæ, ʒij; sacchari albi, ʒj. M. Tere in mortario. Ordered the ulcerated throat to be mopped with this mixture; also the chlorate of potassa gargle, and the special diet to be continued.

6th. Patient decidedly better; faucial ulcers nearly all healed, and he has more appetite; same treatment to be continued.

10th. Patient not so well; he complains of heat and pain in the region of the larynx, but the ulcers have healed over as far down as can be seen. Ordered six dry cups to be put upon the upper part of his chest, to be followed by a sinapism on his breast.

11th. Patient entirely relieved of his pain and difficulty of breathing by the cups and mustard plaster, and he is doing well.

17th. He has some diarrhœa. R. Mistura contra diarrhœam hospitalis. *Signa.* Take one teaspoonful after each stool.

18th. The diarrhœa is checked, and he feels tolerably well.

20th. Bowels again loose, but it does not amount to diarrhœa. Ordered the diarrhœa mixture to be repeated.

21st. All medicine was stopped, and a full diet of whatever he could swallow allowed.

23d. Patient appears to be doing well generally, but he complains of a feeling of soreness in the left side of his throat, which is also slightly swollen. Ordered the painful and swollen part of his throat to be painted with tincture of iodine, and as nourishing a diet as he could swallow to be continued.

24th. Says he feels better; same treatment continued. But he died suddenly in the afternoon of this day from asphyxia, caused by spasm of the glottis.

Autopsy, twenty-four hours after death.—The ulceration of the fauces had entirely healed. There was some extra redness of the larynx. But just beneath the left sterno-cleido-mastoid muscle, in a line with the thyroid cartilage, there was an abscess about the size of an egg, filled with a thick, yellow pus, which had burrowed down to about $1\frac{1}{2}$ inches below the omo-hyoid muscle.

There was also extensive hepatization of the lower lobe of left lung, and middle lobe of right lung. The rest of the viscera, as far as examined, were normal.

Comments.—Was the "sore throat" which attacked this young man, some five or six weeks after he had become affected with gonorrhœa, in reality a manifestation of constitutional or secondary syphilis, or not? This question, which obviously possesses very great practical importance, however, cannot be answered with absolute certainty; but, at the same time, it appears highly probable that syphilis had no part in producing it, *firstly*, because the clinical history shows a complete freedom from syphilitic disease of the skin, lymphatic glands, eyes, bones, muscles, etc.; and, *secondly*, had the affection of the throat been caused by constitutional syphilis, recovery therefrom would not have followed so readily as it did, under the plan of treatment detailed above.

The autopsy showed that abscess underneath the left sterno-cleido-mastoid muscle was developed in the connective tissue, and not from a lymphatic gland. The autopsy also showed that the abscess, which had appeared to be circumscribed when examined externally during life, was in reality attended with an extensive burrowing of purulent matter in the connective tissue adjoining it, especially in a downward direction, and "to about one-and-a-half inches below the omo-hyoid muscle," as stated above. And it is highly probable that the motor nerves of the laryngeal muscles, *i. e.*, the recurrent laryngeal nerves, had been invaded or irritated by this diffusion of purulent matter in the loose connective tissue, or the inflammatory process which attended it, in such a manner or to such a degree as to suddenly cause a spasmodic closure of the glottis, and almost instant death from asphyxia. It is also quite possible that I had myself unwittingly aided to hasten the occurrence of this unhappy termination of the case, by applying that very moderate degree of pressure to the swelling, which it was necessary to use in order to determine the nature thereof, for such an application of force would manifestly promote in a corresponding degree the purulent diffusion just described. I make particular mention of this point, because the calamitous result of this case clearly shows that, whenever the surgeon has to examine cervical abscesses of a similar character, he must always be prepared to lay them open and discharge their contents on the spot, whether any symptoms of impending suffocation be already present or not.

To what should the so-called hepatization of the lower lobe of the left lung and middle lobe of the right, which was noted at the autopsy, be ascribed? The clinical history of the patient does not warrant a belief that it was due to an inflammatory process, *i. e.*, to double pneumonia. It is much more likely that this apparent solidification of the pulmonary tissue resulted from the mode of death; possibly it was caused by an obstruction of the corresponding branches of the pulmonary artery with blood-clots (emboli), detached from the right chambers of the heart by violent struggles for breath during the last moments of life.

Functional disturbance of the recurrent laryngeal nerves to such an extent as to seriously impair the action of the laryngeal muscles, and arising from purely surgical affections, is by no means a novelty in surgical literature, for it has likewise been observed in many analogous instances. For example, the sagacious Hennen (*Principles of Military Surgery*, pp. 286-289, Am. ed.) has reported, with his customary exactness, the case of his friend, Lieutenant-Colonel A. C., a British officer, who was wounded at Waterloo by a musket-ball, at short range, which entered his neck about one inch above the level of his left clavicle, passed backward through the sternal portion of the left sterno-cleido-mastoid muscle, "and inward toward the thorax; but no further trace of its route could be discovered." It was followed by a great loss of blood, which

ceased spontaneously. Very grave symptoms ensued, but it is unnecessary to detail them here. On the fourth day, however, "a new symptom was superadded; his voice, which we had directed him not to employ except on the most urgent occasions, was now lost altogether, and when addressed he pointed constantly to the course of the recurrent nerves, so as to convince us that an affection of them was the cause of this privation." In this case these nerves were doubtless affected by the inflammatory swelling with which holes when bored into the flesh by musket-balls are usually attended; for, when this swelling subsided, his voice returned, and in the end he appears to have entirely recovered from his wound.

But to return to the consideration of our own case: The autopsy showed that the cervical abscess which had produced such dire consequences did not arise from cervical adenitis, but from an inflammatory disorder of the connective tissue, as already intimated above. Now to what course should this disorder of the connective tissue, *i. e.*, the abscess itself, be attributed? It is quite possible that "hospitalism," or blood-poisoning of a peculiar nature, caused by the prolonged breathing of an atmosphere which had become infected in a peculiar manner, performed an important part in its production; for, at this time, the wards of Stanton Hospital were strongly infected with the *contagium* of pyæmia, in consequence of a deplorable mistake in the original construction of the hospital itself—a mistake which consisted in constructing the inner walls of these wards of strong, thick, buff-coloured paper, a substance highly absorbent and retentive of putrefactive gases, instead of hard-finished plastering, which is comparatively a non-absorbent substance (but I should here state that soon afterwards this sad mistake was rectified, by tearing out the paper walls and putting in others made of laths and plastering, as ought to have been done at the outset). This view as to the influence which "hospitalism" may possibly have exerted in the production of this abscess, is favoured by the fact that, although it grew rapidly, it was not attended by the violent symptoms, *e. g.*, the heat, the redness, the painfulness, and the excessive tenderness which characterize the formation of an acute or phlegmonous abscess in this part, but rather by the local phenomena, both subjective and objective, which often attend the formation of so-called secondary or metastatic abscesses.

I have, however, once seen in private practice a deep-seated abscess of the neck supervene during the stage of convalescence, from what appears to have been *eynanche tonsillaris*.

CASE II.—A man, middle-aged, and of good constitution, with whom I was well acquainted, came to my office, some years ago, stating that he had recently had a "quinsy sore-throat," from which he was recovering, and that his throat was now becoming inflamed again, but in a different manner. He said the new attack had also caused much suffering. On examination, I found an inflammatory swelling of considerable size, as well as hard and brawny in feel, on the left front of his neck, extending

from the base of the lower jaw downward to the middle of the neck, or even lower; the skin covering it was tense, hot, and reddened; the swelling itself was very painful and sore; he could not bend his neck, and his head was twisted to the opposite side; he complained much of difficulty in swallowing (dysphagia), but could not open his mouth wide enough to allow me to look into his throat; by inserting my finger, however, I ascertained through the sense of touch that there was now no swelling of the tonsils, and that no retro-pharyngeal abscess existed, nor was one forming. Thus, it became clear that the external swelling was due to an acute inflammation of the deep connective tissue of the neck, and that an acute or phlegmonous abscess was probably being formed. I advised him to use saline diluents, for he was very thirsty, to take as much nourishment in the form of thin oat-meal gruel made with milk, and of beef-tea, as his dysphagia would permit, and to diligently poultice the inflamed part with flaxseed-meal cataplasms, frequently renewed. Three or four days afterward (for meanwhile I had visited him daily at his home), I satisfactorily discerned deep-seated fluctuation in the swelling, and announced my intention to lay it open at once, and thus give vent to the matter. But the patient objected to my haste on the ground that the abscess was not yet "ripe," inasmuch as no "pointing" had yet appeared. In reply I stated that this abscess, owing to the peculiar structure of the neck, was much more dangerous to life than most other abscesses, that before the purulent matter it contained could spontaneously burst through the deep cervical fascia so as to "point" externally, it would burrow more or less widely in the loose connective tissue between the deep-seated organs of the neck, and thus the abscess was very liable to cause sudden death by suffocation at any moment, unless its contents should be discharged externally by incising it. Then he suddenly remembered that his dysphagia was constantly increasing, that his breathing, too, was already much obstructed, and that he had been compelled to sit up through all the previous night in order to avoid a sense of impending suffocation which appeared as soon as he attempted to lie down. Thereupon, he quietly submitted.

Calling to mind the exact anatomical relation of the parts involved in the proposed operation, while the patient remained seated in his easy chair, but with his head firmly held by an assistant, I made an incision about one inch in length along a line corresponding with the inner border of the left sterno-cleido-mastoid muscle, over the summit of the swelling (the centre of which incision was on a level with the upper edge of the thyroid cartilage, and corresponded to the point where the fluctuation was most distinctly perceived), with a scalpel through the skin and platysma myoides; next, I cautiously raised and divided the superficial fascia on a slim director; then, recognizing the deep cervical fascia, it too was raised in a like manner, and cautiously divided, to the same extent as the cutaneous incision; now, using only my fingers and the rounded end of the director or grooved probe, I penetrated the underlying connective tissue with it, until purulent matter freely flowed in the track made by it, thus showing that the abscess cavity was sufficiently opened; about an ounce of laudable pus was immediately discharged; there was considerable sanguinolent oozing from the lips of the wound, but no vessel required ligation. The operation at once gave great relief. That night the patient was enabled to lie comfortably in bed. The dysphagia rapidly disappeared. The abscess healed from the bottom without difficulty under emollient cataplasms. His strength was rapidly restored

by a generous diet combined with bitter and ferruginous tonics, but a number of weeks elapsed before his countenance entirely lost the anæmic appearance it had acquired from the malady.

In comparing this case with the preceding one, certain points of difference are to be noted, notwithstanding the general parallelism: (1) The abscess was much more distinctly phlegmonous in the latter than in the former instance; (2) No policy of delay was allowed to postpone the operation for incising it, as soon as the presence of matter was satisfactorily discerned; and (3) this patient recovered. But, who can say what the result would not have been had the evacuation of this man's abscess, by incising it, been delayed from any cause for twenty-four, or even twelve hours? It seemed to me, however, quite clear at the time that he was exceedingly liable to perish suddenly of asphyxia within that period, at any moment, if vent were not given to the matter without delay by using the knife. This conviction arose in part from anatomical considerations, *e. g.*, the nearness of the abscess itself to the larynx, the dense structure of the deep cervical fascia and the great difficulty or slowness with which perforation of it is spontaneously effected by abscesses, together with the loose structure of the subjacent connective tissue and the readiness with which purulent matter may become diffused in it, especially under the strong pressure exerted by the act of proliferation when the expansion of the swelling is restrained externally by a strong membrane like the deep fascia of the neck; and likewise it arose in part from the presence of laryngeal dyspnoea resulting from the abscess, which already caused the patient much suffering, and now kept him entirely from lying down because it instantly threatened him with suffocation whenever he tried to assume a recumbent posture. The indications were therefore very plain that this highly dangerous abscess must immediately be evacuated; and without doubt, I think, had this abscess not been timely opened with the knife, I should now have another fatal instance to record, instead of a gratifying cure.

I have carefully detailed above the manner in which this abscess was laid open, because a very eminent writer in surgery has dogmatically declared concerning the opening of abscesses, without noting any exceptions whatever, as follows: "The surgeon should use a thin yet broad-shouldered, sharp-cutting, double-edged knife or scalpel. And having predetermined where to make his opening, and the probable thickness of the parts to be divided, he should plunge the instrument rapidly and boldly through the different tissues." (*Holmes's System of Surgery*, vol. i. p. 122, 2d edition.) Further on he asserts: "There are some surgeons, who, in opening an abscess, hold the knife as if they were dissecting, and cut successively through skin, subcutaneous tissue, fascia, etc. Such a practice should not be tolerated; it shows ignorance on the operator's part, and aggravates the patient's sufferings to an unbounded degree."

(*Ibid.*, p. 123.) Now, while I freely admit that these directions are sound so far as the operation for opening abscesses in general is concerned—for incising all those abscesses which are not in close proximity to great bloodvessels and nerves, or deeply seated, or of doubtful diagnosis—I at the same time firmly hold that it would be criminal recklessness for the surgeon to plunge a bistoury “rapidly and boldly through the different tissues” which cover the carotid artery, internal jugular vein, and pneumogastric nerve, into a deep-seated-abscess of the neck which had not yet “pointed” or even approached the cutaneous surface, as must necessarily have been done in the cases related above, if the abscesses had been opened by a single thrust with a bistoury as practised for ordinary abscesses, and as recommended by this writer. When, however, a cervical abscess has already worked its way nearly to the cutaneous surface, or has become “pointed,” and is therefore but thinly covered at its summit, it should always be opened with a single but a carefully guarded cut. But, when a deep-seated abscess of the neck is to be laid freely open along the course of the great bloodvessels of the neck, as in the examples presented above, it must be exposed in a manner strictly analogous to that which is directed by the canons of surgical art for uncovering the carotid sheath in the operation for deligating that vessel. The sufferings of the patient in such a case become a secondary consideration; and the avoidance of them therefore must not be allowed to endanger his safety. However, if time and place permit, anæsthesia should be produced before operating.

Sudden death results from abscesses underneath the sterno-cleido-mastoid muscle, or the continuance of life is greatly endangered thereby, much oftener, perhaps, than is generally supposed. The examples presented above are by no means unique. Mr. Holmes Coote says he has “known the disease prove fatal, by interfering with respiration,” the matter having become diffused. (*Ibid.*, p. 125.) In 1847, a woman was in St. Bartholomew’s Hospital for a cervical abscess, deeply seated, and raising the carotid vessels, which could be felt pulsating over it. There was numbness of both arms, and partial paralysis of the lower extremities. It was opened in order to obviate impending suffocation, and thick matter to the amount of seven or eight ounces was discharged. This was followed by immediate relief to all the symptoms; and the functions of the limbs slowly returned. (*Ibid.*, pp. 126, 127.)

I will further illustrate this important subject, about which we know far too little, by presenting a case taken from my note-book, wherein death by suffocation suddenly resulted from an extensive abscess underneath the sterno-thyroid and thyro-hyoid muscles:—

CASE III.—Jacob M., aged 55, was admitted to the State Emigrants’ Hospital, at Ward’s Island, on the evening of February 15, 1850 (the writer was one of the assistant physicians thereof at the time). The patient, when I examined him soon afterwards, presented the appear-

ance of a hard drinker, and was unable to give any account of himself in consequence seemingly of intoxication. His neck was observed to be considerably swollen; his face also was swollen and red, especially about the eyes, and presented the somewhat corrugated and desquamating look of tegumentary erysipelas beginning to subside. On the following morning, at an early hour, I saw him dying of asphyxia, his countenance being blue, lips livid, etc.; but his general condition was so bad, and the diagnosis so uncertain, that no operative procedure was thought to be warranted.

Autopsy, twenty-eight hours after death.—Cadaver not emaciated; rigor mortis well marked; the neck remains considerably swollen; the left side of face also still swollen. An extensive abscess was found immediately beneath the thyro-hyoid and sterno-thyroid muscles; it was bounded posteriorly by the thyroid cartilage and thyroid body; the connective tissue under these muscles had been largely consumed in its formation; it likewise extended downward under or behind the sterno-thyroid muscle nearly to the origin thereof, *i. e.*, to within an inch of the sternum; more than one-half of the external surface of the thyroid cartilage was laid bare by the abscess, but it was not eroded. The pharynx and fauces were inflamed; they also exhibited four or five follicular abscesses having the size of pigeon-shot. There was an erosion or ulcer on each lateral edge of the epiglottis at its base. The mucous membrane of the larynx and trachea was inflamed, but it exhibited no purulent matter or false membrane. The submaxillary glands on both sides were enlarged; those on the left contained a few points of infiltrated pus. Both parotid glands were likewise enlarged; the right one was also softened and extensively infiltrated with pus.

Right lung extensively fastened to chest by tolerably firm adhesions; inferior and middle lobes thereof in the third stage of pneumonia; superior lobe cedematous, and its apex contains some tubercles which have undergone a calcareous transformation. Left lung congested; its apex adherent, and contains a considerable quantity of tuberculous matter which has also become calcified. Bronchial glands enlarged and calcified. The bronchi contain considerable muco-purulent matter. Heart large and flabby; its right chambers are distended with blood, while its left are nearly empty. Liver larger by one-half than natural, and congested. Spleen three times larger than normal, and congested. Kidneys congested. Stomach actively congested; its mucous membrane thickened (apparently by a chronic process), and softened. Intestines in good condition. The congestion above mentioned was mostly venous, and therefore quite passive; it arose from the mode of death.

This man was already moribund when he came to hospital; and the autopsy shows that no chance then remained for the medical or surgical art to rescue him from death. Although his previous history is unknown, the objective phenomena observed after admission and the revelations made by the autopsy are instructive. Life was suddenly terminated by asphyxia; and the external evidences of this accident, the cyanotic hue of the countenance, etc., were strongly marked. But the internal evidences brought to light by the autopsy were not less striking. They were engorgement of the pulmonary artery and its branches, distension of the right cavities of the heart, while the left were nearly empty, and general

venous congestion. Moreover, the cervical abscess which caused the mischief was found to be still imprisoned within the deep cervical fascia. The abscess itself was shown to have resulted from an inflammation of the deep connective tissue which was widely destroyed thereby; the purulent matter it contained had shown no disposition to "point;" on the contrary, this matter, having cleanly dissected off the exterior of the larynx to a large extent, had followed the sterno-thyroid muscle downward almost to its origin, instead of making its way towards the cutaneous surface. In the conduct of this abscess Nature manifested no conservatism—no inclination to effect a spontaneous cure. Here we clearly perceive the chief reason why it is the surgeon's duty to at once lay open with the knife all deep-seated abscesses of the neck, namely, they do not tend to spontaneously get well, but, on the contrary, to destroy life. Finally, the autopsy of this man shows that, even had the cervical abscess been discerned and opened as soon as he came to the hospital, his life would not have been saved thereby, because there also existed an extensive purulent infiltration of the right parotid, and left submaxillary glands, and of the inferior and middle lobes of the right lung; and, no doubt, the symptoms of septicæmia, too, were present during life.

I can still further illustrate this comparatively obscure subject in a useful manner by presenting another example taken also from my notebook:—

CASE IV.—Margaret C., aged 40, born in Ireland, was admitted to the State Emigrants' Hospital, at Ward's Island, on October 18, 1849, where I was then one of the assistant physicians. She said her illness was of two weeks' standing. Her cheeks, neck, and throat were very much swollen at the time of admission; tongue swollen; the loose connective tissue about the root of tongue much swelled also, but most so on the right side; voice impaired; deglutition difficult; respiration fair. A view of her fauces could not be obtained from inability to open her mouth wide enough to allow it. There was but little redness and heat of the skin which covered the swollen throat, neck, and cheeks. Subsequently, the swelling of the tongue, and of the connective tissue about its root, gradually subsided; but difficulty of breathing (dyspnœa) came on in the evening, and increased in severity every evening until the 26th, eight days after admission, when she expired, in consequence of laryngeal asphyxia (œdema glottidis). On the 24th, two days before death, she began to expectorate an unhealthy pus, like that produced by erysipelas. On the day she died, this expectoration was very free, and the swelling of her neck diminished in proportion.

Autopsy, twenty hours after death.—Embonpoint preserved; some pale frothy fluid between the lips of the cadaver was noted. The deep connective tissue between the muscles of the throat, or anterior half of the neck, was found completely disorganized by an inflammatory process, so that pus and sloughs were present throughout, and an immense deep-seated abscess of the neck was thereby constituted. Pharyngitis also was present; it was most marked on the right side of the organ, where an aperture was found in its walls which communicated with the cavity of

the abscess, and through which the unhealthy pus expectorated during the last two days of life had obviously been discharged. Here the abscess evidently had burst into the pharynx. The larynx was inflamed; and an obstructive œdema of the glottis was found. Below the rima glottidis, the larynx and the upper part of the trachea were filled with colourless frothy serum. But little fibrinous exudation, and no ulcerations were found on the mucous membrane lining the larynx. The epiglottis was bright red in colour. The trachea was also inflamed. There were pleuritic adhesions, both interlobar and parietal, of a rather recent date, on the left side of the chest. The lungs were much congested, but otherwise normal. Liver enlarged and congested. Uterus gravid; it contained a fœtus in the fourth month of its development. There was venous congestion throughout the body, obviously caused by the mode in which death had been produced.

The mechanical cause of asphyxia, in this case, was œdema of the glottis. *It resulted indirectly from the sloughing and suppurative inflammation (or abscess) of the deep cervical connective tissue, especially of the portion which surrounds the larynx, in consequence of the inflammatory process being propagated therefrom, through contiguity, to that organ.* It may be well to remember, in this connection, that the upper part of the trachea, the epiglottis, and the pharynx, had also become inflamed in the same way. Moreover, the œdema glottidis, which killed this patient, ensued, notwithstanding the fact that the abscess itself had burst two days before and spontaneously discharged most of its contents.

The suppuration in this instance was an unhealthy one, as was evidenced by the matter discharged during life, and by the contents of the abscess revealed by necroscopy. Thus, it is shown that the connective tissue inflammation which produced it was an unhealthy inflammation, and one which naturally tended to become diffused rather than to remain circumscribed. Here we should note particularly that the patient was a poor, ill-fed, Irish peasant woman, who had but recently come to America, and that her depraved general condition had probably determined the character of the local inflammation. Now, experience has abundantly shown that there is but a very small chance to save such examples of a diffuse and rapidly destructive inflammation of the connective tissue between the deep muscles, especially of the neck, unless there be employed from the outset a strongly supporting plan of treatment, *e. g.*, tincture of the ferric chloride and quinine with alcoholics, in full doses, and a diet easily digestible, and as highly nutritious as possible; together with deep incisions made as freely and as early as possible, in such a way as to liberate completely the sloughing tissue and the purulent matter as soon as they exist. From the want of such remedial measures seasonably applied, this patient, when she entered the hospital two weeks after her malady began, was in reality too far gone to be saved by any plan of treatment. But why was there no attempt made to

relieve the laryngeal obstruction—the œdema glottidis—by performing a surgical operation? It was because the larynx and upper part of the trachea were so completely surrounded by the abscess-cavity above mentioned, in front as well as on both sides, that the operation of laryngotomy or tracheotomy could not be performed without great difficulty, and even then did not offer any reasonable hope of success, because, if the windpipe were opened by an incision, the matter from the huge abscess would suffocate the patient by flowing downward into that tube. Moreover, the closure of her mouth in consequence of tumefaction, etc., utterly precluded any operation from that direction.

This example, then, affords another melancholy illustration of what is certain to ensue in cases of deep cervical abscess, whenever the requisite plan of treatment is not seasonably employed. It also shows, like the preceding case, that such abscesses, when allowed to run their own course, do not exhibit any tendency to a spontaneous cure; but, on the contrary, they always tend to destroy life.

To complete the consideration of this branch of the subject, it is, perhaps, well to briefly state that deeply seated abscesses of the neck may burrow widely in other directions, and thus result in death. For instance, a man aged 31 entered St. Bartholomew's Hospital with pneumothorax on the right side and general emphysema. He had, however, suffered for some time before these disorders appeared, from pain in his throat and difficulty in swallowing. The autopsy revealed an abscess in the deep connective tissue of his neck, which had burrowed extensively therein, and had likewise burst in two directions, namely, into the upper part of the œsophagus on one side, and into the right pleural cavity on the other. (*Ibid.*, p. 125.) Mr. Callender has examined post-mortem two cases in which there was a deep-seated, burrowing abscess of the neck; in one of them, the pus made its way into the anterior mediastinum; in the other, it surrounded the trachea and extended downward to the roots of the lungs.

But enough has been said to clearly show that the earlier all deep-seated abscesses of the neck are laid open and evacuated the better for both patient and surgeon. And wheresoever, in such cases, the abscess may form, the plan of treatment is always the same. As soon as fluctuation is discerned, the surgeon must proceed without delay to discharge the matter by making a suitable incision, in order that the abscess may not spread downward into the thoracic cavity, nor burst into any part essential to life, nor suddenly cause death by asphyxia.

Moreover, every medical man should impress indelibly upon his memory the fact (which has been clearly shown above), that deep-seated abscesses of the throat or neck do not, as a rule, tend to spontaneously get well; that if they be let alone, or be expectantly or inadequately treated in any other way, they naturally act destructively by burrowing or spreading, etc., and thus kill with great certainty; that there are but few if any

exceptions to this rule ; and, finally, that in all cervical abscesses which are deeply seated, as well as in all cerebral abscesses, the practitioner has no right ever, for a single moment, to expect a successful result unless the matter be promptly discharged by making a suitable incision. The corollary to this proposition is obvious : Should the practitioner not feel himself quite competent to undertake such an operation while the matter is still far below the cutaneous surface and close to the great bloodvessels of the neck, or should he have any doubts about his own ability to discern fluctuation, in such cases, while it is still deeply seated, by the tactile sense alone, he must get competent assistance without delay ; for, by waiting under such circumstances, he will always diminish considerably, and sometimes destroy utterly, his patient's chance of recovery.

Besides an extremely early evacuation by means of a suitable incision, the abscesses described above usually demand the employment of Chassaignac's drainage-tubes and antiseptic dressings ; this point in their treatment I here mention once for all.

Brief mention, too, must be made in this place of *retro-pharyngeal abscesses*, inasmuch as they are always difficult to treat, and are very liable to cause sudden death ; and because, from their kinship thereto, their description naturally follows that of deep-seated cervical abscesses in general. The following examples will serve to illustrate their symptomatology, as well as the chief dangers which attend them.

CASE V.—Dr. Levertin (*Hygiea*, Bd. xxi. p. 692) reports the case of a peasant, aged 46, who, after recovery from typhus and gastric fever, was attacked with dysphagia, on October 13th. Nothing wrong was found in the neck. Next day, the dysphagia was so great that not even a drop of water could be swallowed ; fits of suffocation also occurred.

17th. A swelling was discovered in the pharynx, and tracheotomy was performed by Professor Sautesson. This was followed by some improvement in breathing and swallowing ; but death took place on the 19th.

Autopsy.—The œsophagus, etc., having been laid open from behind, two yellow points were found in its anterior wall, over the arytenoid cartilages. A probe, having been passed into the point on the right side, slipped into the cavity of an abscess as large as a hazel-nut. The larynx was highly inflamed ; but the abscess-cavity did not communicate with it. (*New Sydenham Soc. Year-Book* for 1861, pp. 248, 249.)

The symptoms which resulted from the abscess in this instance were (a) dysphagia, which came on suddenly and increased so rapidly that on the day following the attack nothing whatever could be swallowed ; and (b) a swelling containing purulent matter which projected into the pharynx. Fits of suffocation also supervened as soon as the inflammatory process had spread by contiguity to the larynx ; and, notwithstanding that the operation of tracheotomy appears to have been seasonably performed, this secondary laryngitis caused death by asphyxia. The only operation which might have saved this patient was the puncturing of the abscess

and the discharge of its contents, at an early period in its growth, and before the inflammation had yet spread from the abscess to the larynx.

CASE VI.—A powerful young man, aged 15 (*Würtemb. Corresp. Blatt.* xiv. 1858), experienced pain and swelling at the back of his throat, with inability to turn his head and to open his mouth. There was a painful swelling found in the right parotid region; tonsils normal; no fever. During the first fourteen days the symptoms were somewhat severe, sometimes easier. On the sixteenth day, hemorrhage from the mouth and nose occurred. On the eighteenth day, the swelling at the back of his throat opened spontaneously, and discharged a quantity of bloody, wine-lees-coloured pus. But the swelling was still visible behind the soft palate. After some hours, about a pint of bright-red blood suddenly issued from his mouth and nose; its source was never discovered. Four days later, another hemorrhage occurred, but from the mouth alone. On the following day, a hemorrhage still more severe took place from his nostrils. The external swelling became larger and more painful. In the fourth week, the retro-pharyngeal abscess burst a second time, under precisely similar circumstances, and gave ease to the patient, with cessation of cough, etc. The internal swelling pushed the uvula forward; but, as this swelling abated, the external swelling was correspondingly diminished. The patient, however, died suddenly one night from hemorrhage, which had recurred in a severe form after an interval of fourteen days.

Autopsy.—A carious piece of bone was found on the anterior surface of the body of the atlas. There was an abscess cavity in the connective tissue between the right tonsil and parotid gland, about the branches of the carotid artery, having the size of a hen's egg. It was filled with blood-clot; but the immediate source of the hemorrhage was still uncertain. Two small openings through the wall of the abscess into the mouth were found. (*Holmes's System of Surgery*, vol. i. pp. 133, 134, 2d ed.)

This abscess arose from caries of the body of the first cervical vertebra. The symptoms which it presented were pain, soreness, and swelling at the back part of the throat, with dysphagia and inability to turn the head. But the diagnostic sign was the swelling caused by the abscess itself, which was situated behind the curtain of the palate and on the posterior wall of the fauces, and was plainly perceivable by the senses of both touch and sight. To these symptoms, some phenomena were superadded which may with propriety be termed accidental, because they resulted from a casual extension of the abscess-cavity toward the right parotid gland. The diagnosis in this instance was easily made; as, indeed, it generally is in the examples of this affection where the buccal and faucial cavities are accurately examined by sight and touch, or even by the educated touch alone, when the patient's mouth cannot be opened widely enough to obtain a view. But this patient suddenly expired from hemorrhage, caused by the erosion of some sufficiently important bloodvessel in the abscess-cavity. On this sort of hemorrhage, however, it will presently be necessary to speak again.

Some additional points in the history of this highly dangerous disorder

can best be illustrated by briefly mentioning an example which was treated by the writer with success, some years ago, in Bellevue Hospital.

CASE VII.—The patient was an Irish woman, aged about 30, rather lean and pale, but free from constitutional taints, who said she had been ill but a few days with sore throat and dysphagia. Her voice was much affected, her mouth partly open, and her breath on issuing from it very offensive or stinking. She complained of pain and soreness in the fauces, and that they were greatly aggravated by all attempts to swallow (*i. e.*, there was much dysphagia). Her neck was stiff, and she was unable to rotate her head. Externally, there was a tender and painful swelling found in each parotid region. Her mouth would not open wide enough to afford a view of her fauces. On inserting the right index finger, however, I discovered a rather soft swelling which projected into the pharynx from behind to a considerable distance, apparently almost to the soft palate, and that both tonsils were normal. Believing that I now had to deal with a retro-pharyngeal abscess, I determined to lay it open at once; and, taking in my right hand a long straight, but narrow bistoury or finger-knife, whose cutting-edge was covered with adhesive plaster, excepting about one-third of an inch at its point, while she was sitting in a chair with her head firmly held by an assistant against his breast, and her teeth were separated by a cork, so that she could not bite, being guided into her mouth by the index finger of my left hand with which her tongue was simultaneously depressed, I passed the instrument directly backward into the centre of the swelling, and incised it vertically as freely as possible, in the middle line. A considerable quantity of pus mixed with blood was immediately discharged, which afforded great relief. It was directed that her throat should frequently be swabbed with liquor sodæ chlorinatæ diluted with water (part 1 to parts 10), that tincture of the ferric chloride with quinia should be administered in full doses, that milk punch, too, should be freely given, and that a nourishing diet, consisting of chicken-broth, beef-teen, eggs, and anything she could swallow, should be allowed. The abscess became refilled twice; but it was promptly re-opened each time, in the manner described above. In the end, the patient completely recovered. My unhappy experience with the emigrant cases related above, no doubt, had prepared me to treat this case with much greater satisfaction.

To recapitulate some of the chief points in the history of this highly dangerous disorder: (1) It may result from disease of the cervical vertebræ, on the one hand, and from connective tissue inflammation, on the other. (2) It may cause sudden death by inducing suffocation, by leading to starvation, and by producing a great hemorrhage. (3) In order to treat this grave disorder with success, it is necessary that the diagnosis should be made at an early date, that the pus should be promptly discharged by making a suitable puncture (the earlier the better), that the matter should be promptly let out again and again should the abscess refill, and that chlorinated gargles or washes, with a strongly supporting plan of treatment, should be employed.

Furthermore, various abscesses of the neck may cause sudden death by eroding the cervical bloodvessels, and thus suddenly producing a great hemorrhage. A striking example of this accident has just been presented.

It seems, too, that our predecessors were familiar with this occurrence in other parts of the body, as well as in the neck; for John Pearson (*Principles of Surgery*, pp. 99, 100, London, 1788) observes, in a general way, as follows: "Although the larger arteries have been known to be surrounded with purulent matter for a considerable time without suffering any injury, yet this is not universally the case; there have occurred many instances where erosion has taken place, and the person has been suddenly destroyed with hemorrhage." It is probable that dangerous hemorrhage results from this cause in the cervical region much oftener than many suppose. The late Dr. George McClellan, of Philadelphia, has recorded two instances, brief abstracts of which should here be given:—

CASE VIII.—Mr. Slack, prothonotary at Mount Holly, N. J., had epidemic influenza, which terminated in a critical abscess of a submaxillary gland. This abscess, on being lanced, discharged an ichorous sanies. A few days afterward, a violent hemorrhage broke out, and continued in spite of pressure and cold applications until complete syncope. As often as he reacted, from day to day, the hemorrhage returned, and produced a renewed fainting. After several repetitions of this process, an alarming prostration supervened, and Dr. McClellan was called in consultation. He says: "As the hemorrhage plainly proceeded from some artery in the abscess-cavity, I dilated the orifice through the purple and undermined integument and fascia of the throat and jaw; and, on sponging out the soft coagula, I found that the facial artery had been ulcerated into, just as it passed over the base of the jaw-bone, and that its loose end hung down and pulsated into the cavity of the abscess. I held it between a thumb and finger, applied the ligature; but it proved to be so soft and rotten, that the thread cut through it instantly. I repeated the same attempt twice, nearer the origin of the artery; the last time even after dissecting it out a little from above the submaxillary gland, and underneath the jaw, and the same result followed. The cellular sheath appeared to have been dissolved or softened by the morbid inflammation and unhealthy suppuration which had produced the abscess. As the hemorrhage was greatly increased by these attempts, I seized a spike of iron from the kitchen-wall, and, after heating it red-hot in the stove, I applied its point to the bleeding orifice. The hemorrhage then ceased permanently; and, on applying creasote washes, and ordering tonics and improved diet, we shortly had the pleasure of his perfect recovery." (*Principles and Practice of Surgery*, p. 200, Philadelphia, 1848.)

CASE IX.—The second case occurred in the person of Mr. Ashman, of Ohio, after a great deal of inflammation and mechanical disturbance about the throat, in consequence of severe operations for securing the external carotid artery, and afterwards the internal carotid, in connection with the extirpation of a scirrhus parotid gland. After the wounds of operation had nearly cicatrized, and the patient had recovered strength enough to go out, the lower angle of the old wound broke open afresh, and discharged a violent hemorrhage. This repeatedly occurred, and finally made a large cavity beside the larynx and trachea. On laying it freely open, the superior thyroid artery was discovered at the bottom of the wound, exposed for fully one inch, with a rent or fissure in its tube, from which the blood was welling out. On attempting to ligature it, the thread cut through its tunics at every trial exactly as in the preceding case. Dr. McClellan

says: "I then took a pointed stick of pure lunar caustic, and scared the two ends thoroughly, and afterwards pressed a dossil of lint wet with pure ereasote upon them. This commanded the hemorrhage effectually, and the patient recovered by a return of healthy suppuration and granulation, under the use of tonics." (*Ibid.*, pp. 200, 201.)

This sagacious observer also remarks, in substance, that the various instances, which have been reported, of arteries, and of even veins, having been opened by ulceration or erosion into the cavities of neighbouring abscesses, must be classed in the same category. The softening of their coats by a peculiar species of inflammatory *ramollissement* has led the way to the hemorrhage. Such cases, instead of resulting from a hemorrhagic diathesis or a constitutional predisposition, are plainly derivable from the depraved character of the inflammation which has preceded them. In further support of this view he declares: "I have known of several cases of sudden death from hemorrhage from abscesses and irritable sinuous ulcers in the throat, which resulted from malignant scarlatina in children, all of which undoubtedly must have occurred in the same way." (*Ibid.*, p. 201.)

But the abscesses which result from ordinary tonsillitis (or cynanche tonsillaris) have been attended by fatal or very dangerous hemorrhages, in consequence of the adjoining bloodvessels being eroded, with peculiar frequency. Many instances thereof have been recorded. Dr. Ehrmann reports (*Centralblatt für Chir.*, No. 34, 1879) the following instructive case:—

CASE X.—An Italian, a young man, entered hospital for angina tonsillaris. On the third day the abscess spontaneously burst open, and immediately half a litre of bright-red blood poured from the mouth. Three hours later the hemorrhage recurred, but in less quantity. No pulsation in the tonsillary swelling was perceptible. A third hemorrhage, more severe than the others united, led to the tying of the common carotid artery with two threads, between which it was severed. The hemorrhage ceased permanently. No cerebral symptoms ensued, excepting aphonia, which disappeared in four days. In six weeks he was discharged cured. (*New York Medical Journal*, October, 1879.)

It is not improbable that in some, perhaps in most, of the cases in which the puncturing of a tonsillary abscess is said to have been attended with a fatal or a very dangerous hemorrhage, the loss of blood has in reality been caused by an erosion of the tunics of the bleeding vessel effected by the abscess itself, and not by any wound of these tunics inflicted by the surgeon's knife. Such occurrences have been noted now and then ever since the time of Portal, who mentions a case in which, while opening a tonsillary abscess with a pharyngotome, "a dexterous surgeon of Montpellier had the misfortune to open a large artery, and see the patient perish of a hemorrhage so severe that nothing could arrest it." (*Cours d'Anatomie Médicale*, t. v. p. 509.)

It seems to the writer more probable, however, that the arterial tube even in this case was spontaneously opened by the disease, than that it was accidentally punctured by a dexterous surgeon; the arterial tunics well may have become so much weakened by the morbid process that they yielded to the blood-pressure as soon as the external support afforded by the contents of the abscess was withdrawn by puncturing it, and then the bleeding would have occurred just the same if the abscess had burst spontaneously, instead of being opened by the surgeon. Moreover, in Dr. Ehrmann's case just related, the hemorrhage with which the spontaneous opening of the abscess was immediately attended would have been erroneously attributed to the operation of puncture, if that operation had been performed. The same criticisms are applicable to the other cases belonging to this category. For example: "Tyrrell was accustomed to mention, in his surgical lectures, a case to which he was fetched by a practitioner, who, having punctured an abscess in the tonsil-gland, the wound was immediately followed by severe bleeding, and the patient was dead before he could reach the house." Again: Sir Benjamin Brodie was "cognizant of two cases in which death ensued after the puncture of tonsillar abscess." (*South's Notes to Chelius' Surgery*, vol. i. p. 162, Am. ed.) But it does not appear that in either of these cases the arterial lesion was accurately determined by a post-mortem examination; and, in the absence of such information, it seems more probable that the hemorrhage in each instance was caused by disease of the arterial tunics, as it was in Dr. Ehrmann's case, than by wounds of these tunics inflicted by surgeons. I have dwelt upon this point somewhat, because it is of much practical importance that such hemorrhages should always be attributed to the right cause.

It is also of importance to know that in cases of spontaneous hemorrhage from tonsillary abscess, the erosive action or ulceration may have opened some branch of the external carotid artery, as well as the trunk of the internal carotid; and that the occurrence of such hemorrhages is not restricted to the lesion of a single artery.

On taking a comprehensive view of the subject, it would seem that abscesses in the neck are more frequently attended with hemorrhages due to the opening of important bloodvessels by ulceration or erosion, and by *ramollissement* consequent upon the disorders themselves, than abscesses in the other surgical regions. The superior liability of cervical abscesses to the spontaneous occurrence of dangerous hemorrhages arises in part from the greater number and importance of the cervical bloodvessels; but more particularly, I think, from the inanition and exhaustion, or low state of the constitutional powers, and consequent feebleness of the reparative forces, which rapidly result from most of the deep abscesses of the neck, or rather from the inability to swallow enough food to support life, and from the powerlessness to get any refreshing sleep, or even repose,

with which these abscesses are oftentimes attended. The septic or toxæmic influence of the fetid secretions and exudations which present themselves in the oral and faucial cavities in many instances, also aids materially to still further depress the patient, and weaken the reparative processes of his system.

Finally, how should the hemorrhages which spring from these cervical abscesses be treated? The chief points in the therapeutics, both surgical and medical, have already been mentioned while presenting the several examples of this accident. To briefly recapitulate them: The abscess-cavity in such cases always should be freely laid open, the coagula turned out, the bleeding point or source of the hemorrhage brought distinctly into view, and the delinquent vessel itself should be ligatured on each side of the aperture in its walls. But should the ligatures cut through, *i. e.*, should the vessel's tunics prove to be too soft or too weak to hold the threads, the actual cautery must be applied to the bleeding point, as was practised by McClellan under such circumstances, as stated above. And especially is the practitioner to be warned against the use of liquor ferri persulphat. or perchlorid. as styptics in such cases; because, if he employ these acid ferric salts, he will not unfrequently fail to suppress the bleeding permanently, on the one hand, while he will, at the same time, always do considerable harm by causing a hard and quite insoluble coagulum to be formed by them which will greatly interfere with the subsequent application of ligatures or of the actual cautery in cases of failure to control the hemorrhage; and, even in cases of success, will greatly retard the cure, from irritation and difficulty of removal.

An antiseptic plan of after-treatment, with thorough drainage of the abscess-cavity by means of Chassaignac's tubes, is generally of much value in cases of hemorrhage from cervical abscesses; and it is of interest to note in this connection that the sagacious McClellan had already found, long prior to his sudden death in 1847, the great value of antiseptic dressings in such cases, and he makes particular mention of "*creasote washes*," *i. e.*, lotions containing impure carbolic and cresylic acids. To this plan of after-treatment, the ferruginous and bitter tonics, *e. g.*, quinine and iron, in full doses, should be added, together with milk-punch, wine, or porter, and a very nourishing diet.

But what should be done in cases where the abscess-cavity cannot be laid open, so as to expose the bleeding vessel to view, and allow it to be secured with ligatures, or restrained from bleeding by applying the actual cautery? In such cases, the primitive carotid artery should be firmly compressed against the cervical vertebræ by the surgeon's thumb or fingers applied on the anterior part of the corresponding side of the neck, between the larynx or trachea and the inner border of the sterno-cleido-mastoid muscle, with force enough to press the artery backward and inward against these vertebræ, and flatten it thereon. This pressure should be

exerted continuously and sufficiently, as well as in the right direction to embrace the artery between it and the bone; also long enough for the apertures to become securely plugged with coagula, if possible. Should this procedure fail, it will be advisable, especially in cases where the bleeding proceeds from tonsillary abscesses, to ligature at once the primitive carotid artery. This vessel is to be selected for deligation in such cases because it cannot be determined during life whether the hemorrhage from a tonsillary abscess has its source in a branch of the external carotid artery or in the trunk of the internal carotid artery, as already stated above. And by the timely performance of this operation, in such cases, the surgeon may often be gratified, as, indeed, Dr. Ehrmann, mentioned above, was gratified in seeing the hemorrhage permanently suppressed and his patient saved.

What plan of treatment might possibly have saved the case of retropharyngeal abscess, mentioned above (Case VI.), in which death from hemorrhage suddenly occurred? It should, in the first place, be observed that the collection of matter was what our predecessors were wont to term a *congestive*, instead of a *phlegmonous* abscess, *i. e.*, the purulent matter having been formed elsewhere, in consequence of caries of the first vertebra, had settled downward behind the pharynx, etc., and therefore this matter was not the product of connective-tissue inflammation behind the pharynx. It may well be that, had this purulent depot been fully emptied by an early-made incision, and subsequently kept empty in the same way, had the patient's throat been cleansed at short intervals with chlorinated washes (*e. g.*, liquor sodæ chlorinat., part 1, to aqua, parts 8 or 10), and had his strength been sustained by administering iron and quinia, with alcoholics, and all nutritious kinds of food which could have been swallowed, the systemic deterioration and the hemorrhage resulting therefrom would have been prevented.

ARTICLE II.

A CONTRIBUTION TO THE GENERAL KNOWLEDGE CONCERNING THE PRURIGO PAPULE. By ROBERT B. MORISON, M.D., of Baltimore.

ALTHOUGH there has been much written about, and many descriptions made of, the histology of the prurigo papule, the opinions of authors have not always agreed; and it was with the idea of settling as far as possible the disputed points and differences, that I undertook the following investigations in Prof. Chiari's pathological institute at Prague, on material kindly furnished by Prof. Piek, which was taken *intra vitam* at various stages of the disease under the latter's personal supervision.

Earlier authors examined the skin after death, or were satisfied with a few specimens taken *intra vitam*, but the material furnished me by Prof. Pick has been such that no stage of the disease has been wanting. No other, then, has had the chance thus offered for a careful and thorough investigation into the changes occurring in prurigo.

Before the time of Hebra, prurigo and pruritus were synonymous terms. Willan¹ divided prurigo into four classes: P. mitis, P. formicans, P. senilis, P. sine papulis. His idea was that the itching represented the chief symptom, and that the absence or presence of papules did not change the character of the disease. Macroscopically, he describes them as soft and smooth, rather larger and less pointed than those of lichen, and as seldom red or inflamed, excepting when rubbed or scratched. They are covered with crusts formed from the thickening of a watery fluid mixed with blood contained within them, which is seen when the tops of the papules are removed in any way. The author looks upon the disease as a neurosis.

Bateman² follows Willan in his description of the papule, as does also Plumbe,³ the latter remarking that they are in no way necessarily present in the disease known as prurigo, and that in fact, in most cases coming under the notice of a physician, itching is the only symptom.

Alibert,⁴ also recognizing no difference between pruritus and prurigo, says, however, that this disease, which he calls "psoride papuleuse," consists of a characteristic eruption of papules which in form and colour resemble the skin.

Cazenave⁵ describes them more minutely, and says that they are sometimes small, slightly raised above the skin, perceptible to the touch, and accompanied with severe itching; at other times they are larger, more elevated, and accompanied with itching, which is unbearable. They never touch each other, and have generally the same colour as the skin, when they have not been torn by the nails. When present in great quantities, and when their tops are scratched off, a drop of blood escapes which coagulates and forms a characteristic crust. In many cases this crust falls off, leaving behind a somewhat prominent point. Sometimes the papule disappears entirely with it. Those papules which have not been torn off, either disperse themselves, or disappear by the formation of fine scales which afterward drop off. Where the disease has lasted for a long time, they are hard, very large and prominent. The eruption is accompanied with a noticeable thickening of the skin.

The same author⁶ considers prurigo an inflammation of the nerve end-

¹ On Cutaneous Diseases, 1808.

² Practical Treatise on Skin Diseases, 1835.

³ On Diseases of the Skin, 1827.

⁴ Descriptions des Maladies de la Peau, 1825.

⁵ Abrégé pratique des Maladies de la Peau, etc., 1838.

⁶ Gaz. des Hôp. 1847, p. 104.

ings, *i. e.*, a hyperæsthesia, and the eruption as only accidental. He makes no difference between pruritus and prurigo.

A. Simon,¹ in describing the minute anatomy of the papule, found the epidermis intact, the papillæ not enlarged, and the connective tissue not changed. According to the author, the papule is, therefore, probably due to a simple infiltration of the skin with serous fluid. He does not agree with Hebra, that the fluid which escapes from a papule is contained in a hair follicle.

Wedl² described the larger papules as often filled with a yellowish fluid, and pierced with several hairs. The papillæ were tinged with blood, and red points could be seen similar to an injected loop of blood-vessels.

Canuet³ explains lichen and prurigo as neuroses of the skin. In his opinion both diseases agree in their premonitory symptoms and sequelæ, and only differ in the character of the eruption, which he considers of secondary importance, and which may indeed be absent without, however, affecting the intensity of the other symptoms. He considers that the symptoms of both accord with those of a neurosis, and it is not infrequent to see first lichen, then prurigo, indeed, sometimes, both diseases at the same time, upon the same individual, coming from the same causes, and appearing under the same circumstances. They are usually seen in nervous individuals, especially in women, and in nearly half the cases after a sudden emotion.

It can plainly be seen that this author does not consider prurigo as a distinct disease in the sense of either Willan or Hebra.

Von Baerensprung⁴ does not consider the disease a neurosis. The papules appear upon the skin, together with a feeling of increased warmth, and are always without fluid contents. If torn with a needle, it is possible to draw out a sebaceous gland filled with a dense layer of cells, and looking like a small sac. The papules are, therefore, not inflamed papillæ, but sebaceous glands, which, instead of secreting sebum, are filled with epithelial cells, and this gives the paper-like dryness, and dirty yellow colour to the skin.

Von Veiel⁵ looks upon the disease as hereditary, and apparently does not distinguish between it and pruritus, although he does not seem to look upon the former as a neurosis. It usually skips one generation, being handed down from grandparent to grandchild.

This author stands alone in his opinion, that the disease can be handed down as an inheritance.

¹ Die Hautkrankheiten durch Anatom. Untersuch. 1857.

² Grundzüge der path. Histologie, Wien, 1854, p. 247.

³ Gaz. des Hôp. 1856, 126.

⁴ Ann. d. Charité zu Berlin, viii. 1858.

⁵ Prag. Vierteljahresschrift f. Prak. Heilk. 1862, p. 70.

Chârcot and Vulpian,¹ in treating cases of progressive locomotor ataxia with nitrate of silver, noticed that sometimes an eruption resembling prurigo would break out upon the whole body, but especially upon the legs, and which would last as long as the silver was used.

Tilbury Fox² describes the papules as pale, and due to an exudation in the skin. They are caused by a disturbance in regeneration and innervation, particularly in paresis of the nerves. Where there is a predisposition to the disease, he considers that the prurigo papule may be accelerated in its development by the presence of parasites, or insects, and may attain its customary appearance in consequence of scratching.

It was Schönlein who first pointed out the connection of the diseases of the urinary organs to prurigo, and to this connection Eydum³ calls especial attention by relating several instructive cases.

Derby⁴ found every papule pierced by a hair, and the external layer of the sheath pouched where the hair muscle joined it. This pouch, composed of epithelial cells similar to those of the sheath, and with which it was in close connection, pushed itself between the cells of the muscle. He describes also marked hypertrophy of the *M. arrectores*, the cells of which appeared thicker than normal, sharply outlined, and granular; the hair itself more perpendicular, thinner, and very friable. Surrounding the lower part of the hair sheath could be seen a large number of round, shiny cells, which earmine coloured deeply. The bloodvessels of the hair, the corium, and the papillæ of the skin enlarged; the cutis filled with spaces surrounded by connective tissue, in which here and there exudation-cells could be seen. These spaces, according to the author, are due to a serous exudation, which expands the normally very narrow lymph-spaces, and which escapes from the papules when they are opened, as a clear or rather bloody drop.

From his investigations is explained, according to Derby, why the prurigo papule does not appear in places devoid of hair, such as the palm of the hand, the sole of the foot, and also very seldom upon the flexor side of the extremities, where few hairs grow. In an old case of prurigo Derby found all the appearances so often seen in a chronic dermatitis, such as lengthened and broadened papillæ; the corium everywhere filled with a serous fluid; the rete Malpighii much thickened, its lower layer of cells long drawn out, narrow, cylindrical, in the middle layer well-defined prickly cells; between both layers many wandering cells, in the protoplasm of which brown pigment bodies were inclosed.

Gay,⁵ using the skin of a person ten years old, who died of pneumonia, describes the changes found in pieces taken from various parts of the body.

¹ Bull. de Thér., t. lxii. June, 1862.

² Transact. St. Andrew's Med. Assoc. iii. 1869.

⁴ Sitzgsb. d. Wien. Akad. B. LIX. II. 2.

⁵ Archiv f. Derm. und Syph. 1871, H. 1.

³ Deutsche Klin. 38-39, 1860.

He considers these changes divisible into two groups: the first, including those of the rete Malpighii, and the organs standing in connection with it, such as the hair sheaths and sweat glands; and the second, including those in the corium and papillæ. In the rete Malpighii he describes cells containing single or double nuclei, with their centres drawn in like a biscuit. He calls attention to the extraordinary case with which the nuclei of many cells, as well as the cells themselves in the deeper layers, are tinged with earmine. In severe cases these cells have the character of horny epithelium; there is also enlargement of the sweat glands and of the vessels of the hair papillæ.

The result of his investigations leads him to the following opinion: The pruriginous process begins in the papillæ of the corium, and the tissue of the same is, after a dilatation of the vessels, which can be proven to take place microscopically, much richer than normal in cells. After this exudation, the rete Malpighii becomes infiltrated with small cells and thickened, while the stratum corneum also becomes thickened, because the upper layer of the rete Malpighii changes its character, and becomes horny. Hand in hand with the changes in the rete Malpighii a cell infiltration occurs around the hair sheath. The increase in the cells of the outer layer of the sheath is confined to single places, principally in the neighbourhood of the muscles. The latter are hypertrophied. The sweat glands take part in the process in the same intense manner as the hair sheaths.

Hebra¹ does not think it necessary to change his opinion since the first edition of his book with regard to the anatomy of the prurigo papule. He considers that it is, in all respects, like a vesicle, differing from the latter only in the small amount of fluid contained in it, and in the thickness of the epidermis which covers it. Further, that after a severe attack, the glandular apparatus of the skin suffers through sympathy, and, lastly, that the changes which one sees in chronic cases do not belong to prurigo alone, but to any chronic disease which has affected the skin for a long time.

If one examines a lately affected piece of skin containing a single prurigo papule, the papillæ are found somewhat enlarged, tissues œdematous, and containing a moderate number of cells covered with a stratum of epidermis, containing in the deeper layers swollen-up or proliferating cells, sometimes wandering cells. He considers that the papule of prurigo is formed by a collection of fluid in the deeper layers of the epidermis, and by the consequent elevation of its upper layers.

Klém² considers prurigo to be due to an affection of the nerves, and that the papules follow the primary itching, as in herpes zoster, and, according to this author, it has not been shown by experience that the disease attacks by preference sickly children, or such as suffer from rhabdismus, serofula, etc.

¹ Lehrbuch der Hautkrankheiten, 1874.

² Jahrb. f. Kinderk. 4 H. 1874.

Eisenschütz,¹ on the other hand, says that even the worst cases of pruritus are never followed by a true prurigo, and does not agree with K. that the itching is caused by the presence of serum and pus in the vesicles, or that arsenic has any especial effect upon the disease.

Anstie² does not distinguish between pruritus and prurigo, since he speaks of prurigo senilis, meaning, in Hebra's sense, pruritus.

Duhring³ uses the term prurigo in the sense attached to it by Hebra, and cites Hebra, Derby, Neumann, and Gay for the pathology of the papule. In his ideas of the disease he differs from the majority of English and American writers. It is a rare disease, according to this author, in America and England as well as in France.

Piffard⁴ follows Hebra in the description of the disease.

O. Simon⁵ agrees on the whole with the descriptions of Derby, Gay, etc., but found quite the same changes from investigations of other chronic inflammatory conditions of the skin, and would not accord to them any pathognomonic signification for prurigo. Especially does this hold good respecting the changes in the hair sheath and muscles.

Esoff,⁶ in examining normal skin, frequently found epithelial pouches springing from the outer layer of the hair sheath, and these he divided into two groups. To the first belong those which are not connected with the M. arrectores, and also those described by Neumann as peculiar to lichen ruber. These appear in the form of long pouches, which contain a hair shaft.

To the second group belong those which are seen at the insertion of the M. arrectores. These pouches also begin in the outer sheath layer, and are a continuation of the same. In this group, both in respect to their size and position, the author includes those pouches described by Gay and Derby in prurigo.

Neumann⁷ considers the prurigo papule due to a cellular infiltration and serous exudation of the papillæ. The rete Malpighii is hypertrophied, its cells rich in pigment. The papillæ are enlarged, their tissue meshy, the cutis thickened by tense connective tissue, the walls of the vessels thickened in places, with an increase of cells of the external sheath layer. The hair follicles are pouched out in the form of clubs, the smooth muscular fibres hypertrophied. He considers that a careful study of the nerves of the skin must be undertaken to decide whether or not an anatomical change in them is not the cause of the disease.

Auspitz,⁸ reasoning upon the investigations of others, is of the opinion

¹ Wiener, Rundschau. Sep. 1874.

² Journ. Ment. Se. xvi. April, 1870.

³ Diseases of the Skin, 1877.

⁴ An Elementary Treatise of Dis. of the Skin.

⁵ Berlin. Klin. Wochenschrift, No. 49, 1879.

⁶ Vierteljahrseft. für Derm. und Syph. 1877, p. 595.

⁷ Lehrbuch der Hautkrankheiten, 1880.

⁸ System der Hautkrankheiten, 1881; Ziemssen, Hautkrankheiten, 1883, p. 193.

that the papule of prurigo is nothing else than a kind of *liehen pilaris*, a thickening of the epidermis around the lanugo-hair, or around the openings of the sebaceous ducts. They do not have the slightest trace of an inflammatory infiltration, as they are of the colour of the skin. They remain papules, and never become vesicles or pustules, if they are not scratched or rubbed. He considers that, if the papule does not belong to an inflammatory process, which can be proven clinically and histologically (?), that if it is always in connection with a hair follicle, and if the clinical resemblance with *liehen pilaris* and *cutis anserina* is not forgotten, and, further, that if the itching cannot be explained as due to any inflammation, he is justified in formulating the following explanation: Prurigo is, like pruritus, a sensory neurosis of the skin. It differs from pruritus by the primary appearance of papules, which, just in the same manner as itching represents a sensory neurosis, represent themselves a contractile neurosis of the skin. This is explained anatomically by the hypertrophy of the smooth muscular fibres, and physiologically by the simultaneous appearance of *cutis anserina*, which last, due to the constant cramp of the muscles, produces a sort of tetanic contraction of the same.

Auspitz calls attention to the fact that he has frequently seen relapses of prurigo, in which there was no doubt about the diagnosis, and where there were all the symptoms of the disease, excepting the appearance of the papules, and he considers it an open question whether, in such cases, the proper diagnosis would be made in England or America, where it is supposed to be so rare. He does not think that the papular eruption plays in any way a more important part than the never-failing sensory neurosis, and so he considers the hypothesis that prurigo is really a combination of a sensory with a contractile neurosis, sufficient to explain its peculiar symptoms and its relation to pruritus cutaneus.

Kaposi¹ does not consider it possible to ascribe anything peculiar to prurigo microscopically after the consideration of his own and others' investigations. According to him, there is only a moderate infiltration with serous imbibition of the papillæ in the region of the papule, while the changes in the rete Malpighii are the same as in eczema papulosum. Where the disease has lasted for many years, there are the same changes as in chronic dermatitis and chronic eczema, *i. e.*, thickening; proliferation in the rete Malpighii; scattered pigment in the corium, with largely increased number of infiltration cells, especially marked around the vessels; here and there enlargement of the lymph spaces, as well as some of the sweat glands by proliferation of their cells, in some places bulging of the follicle, caused by the uneven growth of the sheaths; thickening of the M. arrectores, and, lastly, in old cases, atrophic degeneration of the follicles and sebaceous glands.

¹ Path. und. Ther. der Haut. 1883.

He does not consider that these anatomical changes explain the itching or the localization of the process. It may be, as Hebra says, that the former is caused by the fluid in the papule, but as such severe itching does not occur in other circumscribed exudations (herpes and erythema papulatum), the theory is not entirely satisfactory while the localization and the obstinate renewal of the papule is still unexplained. He does not consider the disease a neurosis like pruritus cutaneus, on account of the perceptible changes in the skin; for he considers it certain that all the symptoms of the disease go hand-in-hand with the increase or decrease of the papules. In pruritus cutaneus, no matter how long the duration of the disease, there are none of the signs of prurigo, there are no papules, and the localization is not the same.

Behrend¹ does not consider that the prurigo papule is always necessarily pierced by a hair, or that the position of the papule is in connection with the hair follicles. It holds a watery fluid and on this account he considers the papule owes its formation to an exudation. The itching is brought about by the irritation which this fluid exercises upon the sensory nerve endings in the skin, and he holds that it is a secondary symptom just as it is in urticaria, lichen ruber, etc.

He does not agree with Auspitz that it is a neurosis from clinical reasons. It would be difficult, he says, to explain why the nerves, which are found on the palm of the hand and soles of the feet, as well as those which regulate the skin on the flexor sides of the joints, always remain intact, and that in these places in the most inveterate cases there is no itching, being on this account never scratched. Further he does not consider that the papule is due to a tetanic contraction of the arrectores pilorum, for the same hypertrophic condition of the muscular fibres occurs, for instance, in elephantiasis arabum, without there being anywhere the appearance of cutis anserina.

In running over the opinions of those just cited, we see that they are divided into two sets, first those who consider the disease a neurosis, and second, those who do not. Those who consider it a neurosis (Willan, Cazenave, Bateman, Alibert, Fox, and Auspitz) lay little stress upon the pathological changes occurring in the papule, while those who do not consider it a neurosis (Derby, v. Baerensprung, Gay, Hebra, Duhring, Simon, Behrend, Neumann, and Kaposi) are divided into three groups. Derby considers the changes due to the hairs. Hebra thinks the first appearance of the papule is in the epidermis, while Gay and Neumann, etc., say it is in the papillæ.

The reason of the divergence of opinion about the pathology of the papule is due to the material used by the different investigators. One examined the skin from one stage of the disease, while the others took it from other stages; I shall return, however, to this question later on.

¹ Lehrb. der Hautk. 1883.

Having thus given a cursory description of the prurigo papule, according to the opinions of others, I shall now proceed to describe the result of my own investigations, and with the idea that the difference of opinion with regard to the papule was due to the fact that the disease had not been examined with sufficient care in its primary and later stages, I have tried, as far as possible, to obtain the papules from patients affected with the mildest form of the disease, as well as from those in whom it had made such progress that it appeared in its most intense form.

Material has been furnished from seven different patients, from whom twelve different pieces of skin have been excised *intra vitam*, care being taken to mark such papules as were most indistinct before excision with India ink, and this was done in order that there might be no doubt that the papule itself came under the field of the microscope. This was found to be especially necessary with papules which could only be felt, as the macroscopic changes in them were so slight that one could not be absolutely sure of the position which they held in the section. In order to give an idea of the different stages of the disease from which the skin was taken I shall give a general outline of the seven cases referred to. As, however, from these seven cases twelve different pieces of skin for examination were taken, I shall consider them as so many cases, it being my object not necessarily to take them from different persons, but from different stages of the disease. The incisions in the skin were made deep enough to include the corium, and in some cases part of the subcutaneous tissue. The places were chosen with great care by Prof. Pick, and the excisions made either by him, or under his supervision. With the proper regulation of the treatment, and by intermitting it as required, the prurigo papule can be obtained in its earliest and latest form, and while this method of procedure enables one to obtain a clear idea of the papule microscopically, it also assists in its closer clinical study, which has a direct bearing upon the history of the papule itself.

CASE I. F. K., aged 10, entered hospital for the first time on February 9th, 1883, affected with prurigo. The patient has been troubled with itching from the earliest infancy. Parents and other members of the family, consisting of four sisters and one brother, are all healthy. The eyes of the patient have been congested for several years; he also suffers from nasal catarrh.

Status præsens. The patient for his age is small, pale, and weak-looking. His skin is somewhat pigmented, which is most noticeable on the trunk and extremities, extensor sides. It is covered in the latter places with somewhat elevated papules, which have bloody crusts upon them, whereby the skin appears rough, uneven, dry, and thickened. The inguinal glands somewhat swollen, and the glands in other places more than usually prominent. Was treated with glycerine, amylum powder, and baths. After the skin had become soft and pliable, and the papules had all disappeared, a piece was excised on February 21st, from extensor side of the right humerus.

CASE II. M. M., aged 7, entered hospital for first time on January 12, 1883, affected with prurigo. Mother died at 36 of phthisis. Two other children at 8 and 11 years, respectively, are healthy. The present affection, according to statement, has existed since the second year of her life.

Status præsens. Patient for her age is weak and undeveloped. The skin, especially upon the extensor side of the extremities, rough, and covered with scarcely visible prurigo papules. The glands generally are swollen. Treated with baths, glycerine, and amylum powder, and sent out with a smooth skin on March 11th. Returned to hospital on the 19th with a well-marked prurigo eruption. On the 21st, before any treatment was undergone, a piece of skin containing two papules was excised from the extensor side of the humerus.

CASE III. W. K., aged 17, entered hospital for the first time January 9th, affected with prurigo agria and acute nephritis. The disease showed itself in his second year. It began upon the legs and spread gradually over the whole body. His glands have been swollen for a long time. Father of patient died of tuberculosis. The rest of the members of his family are healthy. The house in which the patient lives is damp, and for some time past he has been sleeping upon the floor. Patient coughs. Treated in usual way, and sent from hospital February 6th, with a smooth skin, and no albumen in urine. Returned to hospital March 26th, with a reappearance of the disease. Three days after his entrance, and before any treatment was undergone, a piece of skin, containing a prurigo papule, was excised from the calf of the left leg.

CASE IV. C. L., 12 years, entered hospital for the second time January 18th, affected with prurigo. There is no history showing that any other members of the family have this disease. The eruption is just beginning all over his body, but scattered here and there upon his hands and feet are seen a few vesicles. One of these was excised. From a papule upon his thigh, a hair was pulled out, great care being taken to bring with it as much of its sheath as was possible.

CASE V. Same as Case II. The patient, having been sent from the hospital, returned after a while with a reappearance of the disease, and before any treatment was undergone, a piece of skin containing a papule was excised from the extensor side of the left thigh on April 4th.

CASE VI. Same as Case IV. A piece of skin taken from the thigh. The eruption had become more prominent since the excision of the first piece, which occurred two days before, as the patient had been subjected to no treatment.

CASE VII. F. N., 11 years old, entered hospital for the first time February 8, 1883, suffering from prurigo. The patient is the only one of a family of eight children thus affected. From his infancy has been troubled with severe itching, which was especially bad upon his legs.

Status præsens. The patient looks pale, and is of small stature. The skin of the trunk is somewhat pigmented, and scattered here and there upon it are seen pin-head-sized papules covered with bloody crusts. These, including pustules, are present also in large numbers upon the extensor sides of the extremities. On the legs, in their whole circumference, there are large confluent pustules in some places forming ulcers. The glands are swollen everywhere. On April 12th, and while the disease was in a complete state of eruption, a papule was excised from the left arm.

CASE VIII. Same as Case III. A piece of skin containing a papule was excised from the extensor side of the thigh on April 19th, after a week's intermission of treatment, and when the eruption was just beginning to appear.

CASE IX. J. K., aged 26, entered hospital, where she had been treated many times before, on March 30th, affected with prurigo. The eruption extends over the whole body, and began with itching in her earliest infancy. Her menses have been regular since her 16th year. The patient is strong, well-built, and well-nourished. Her skin is pigmented and rough, especially so on the extensor sides of the extremities, which are covered with scratched and unscratched papules. Inguinal glands much swollen. *Pediculi vestimentorum*. After a long treatment with baths, *solutio Vleminecx*, etc., the papules all disappeared, and the skin remained simply pigmented and thickened. In this state a piece of skin was taken from the right thigh, extensor side, on May 1st.

CASE X. Same as Case II. After a period of treatment, during which the skin became apparently normal, the patient was left alone for a week, and just as a relapse was beginning, a prurigo papule, which could be more plainly felt than seen, was taken from the right thigh. It did not differ from the skin in colour, was very slightly raised, and had not been scratched. Before excision it was marked with India ink, and afterwards placed immediately in absolute alcohol.

CASE XI. W. M., aged 11 years, entered the hospital for the first time May 27, 1883, affected with prurigo. The disease has lasted a year and a half, and began, according to his statement, with the formation of papules. His parents, two brothers, and one sister are healthy.

Status præsens. Patient, for his age, is abnormally well developed, his skin is rough and pigmented upon the extensor sides of the extremities, where it is thickened and covered with papules, and shows, from the bloody-looking crusts which cover the various pustules and small ulcers, the extent to which scratching has been carried. The inguinal glands on both sides swollen to the size of a walnut. On the day following his entrance, and before treatment had begun, a piece of skin containing a papule was taken from the right arm above the elbow-joint. This papule had not been scratched, and although less prominent than any of the others, it could be plainly seen and felt. Before excision it was marked with India ink.

CASE XII. Same as Case I. After undergoing treatment for some time until the skin had become to all appearances normal, the patient was left alone for a few days and carefully watched, in order that a papule might be excised in its earliest stage. As soon as one was felt, and when it was not even visible to the unaided eye, it was marked with India ink and then excised.

The clinical histories of the cases have been given in the order in which the material was taken from the patients, but in making a histological description, I shall begin with that papule which appears in the earliest stage of the disease, and shall for this reason choose Case XII. as the first one to be described.

From Case XII., which had undergone treatment, and in which the disease was just beginning to reappear, a piece of skin 1 cm. long and $\frac{1}{2}$ cm. wide, was cut from the left thigh, extensor side. It contained one

papule which could be plainly felt as a body about the size of a millet-seed, but could not be seen without the aid of a magnifying glass, and this showed it to be slightly raised above the rest of the skin in the form of a rounded elevation. The other part of this piece of skin was soft and pliable like normal skin, and there were no appearances of its having been scratched, showing that no itching had previously existed. Before its excision the papule was marked with India ink, and the whole piece then hardened in alcohol. This piece of skin was cut into a series of thirty-six sections, the first one beginning at the edge of the papule. They were then stained in gentian violet and mounted according to their order in Canada balsam.

The microscope disclosed two hairs which pierced the papule in its centre, and near them, running to its surface, the duct of a sweat gland also. In the papillæ lying between the hairs is seen a slight amount of round-cell infiltration, which in those sections corresponding to the middle of the papule is most intense around the upper layer of vessels of the corium, or where the papillary vessels join them. The papillæ are somewhat elongated, and a few infiltration cells surround their vessels, the hair sheaths, and glandular duct. The *M. arrectores* are not hypertrophied, and there is a slight bulging of the whole portion of the skin which lies above the infiltration, and which includes ten or fifteen papillæ counted as they appear on the flat surface of the section. Both hair sheaths are slightly pouched and uneven, corresponding to the changes described by Derby, Gay, and Neumann, but the sebaceous and sweat glands are unaltered. The infiltration in this specimen, starting from the upper layer of vessels of the corium, extends upward as far as the rete Malpighii and there stops. The epidermis is not thicker above the infiltration than elsewhere in the section, and in it, quite unaltered, are seen the elongated cells of the first layer of the rete mucosum, the well-defined prickles, the stratum granulosum, the stratum lucidum, and then the horny layer, to which the India ink clings, marking the exact position of the papule. In none of the sections is the slightest trace of a vesicle to be seen, or any of those small heaps of scaly epithelium which characterize the epidermis of the cases taken from a later stage of the disease.

The other portions of the skin, adjacent to the papule, have a few wandering cells scattered here and there around the vessels, but otherwise there is no change from the normal.

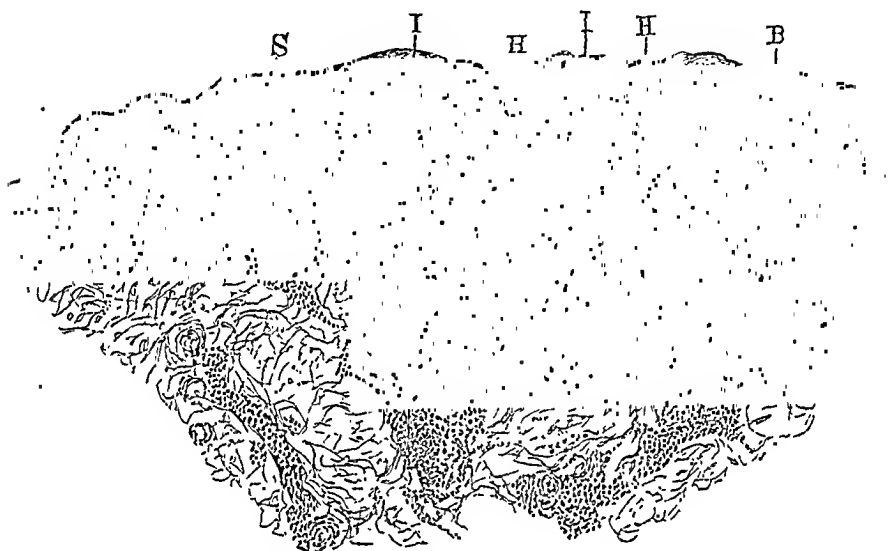
Fig. 1 shows well the microscopical changes, which consist, as has been described, simply in a small amount of round-cell infiltration.

From Case X., which was a little further advanced than the previous one, a piece of skin $\frac{1}{2}$ cm. wide and 1 cm. long, and containing a papule, plainly felt as a body somewhat larger than a millet seed, but which was scarcely visible, was cut from the extensor side of the right thigh, and the papule having been previously marked with India ink, the whole

piece was placed in alcohol. The adjacent skin was to all appearances normal, and had not been scratched.

This piece of skin was cut into a series of thirty sections, the first one being made at the edge of the papule, and after staining with gentian violet they were mounted according to their order in Canada balsam.

Fig. 1.



The papule lies between A and B. I. Infiltration. H. Hairs. S. Opening of a sweat duct.
(Oc. 3; ob. 4. Reichert.)

As in Case XII. the infiltration was seen to be most intense around the upper layer of vessels of the corium, and where the papillary vessels joined them. From this point it runs up into the papillæ, stopping at the rete Malpighii. Three hairs pierce the papule, and there is a sweat-duct running through it. The infiltration surrounds the vessels lying between the hairs, but does not affect the sebaceous glands, which are quite unchanged. There is no appearance of hypertrophy in the *M. arrectores*, nor are the sudoriparous glands, the entire duct of one of which is seen passing through one section, altered in any way. The papule includes ten or fifteen papillæ which are more or less infiltrated and decidedly elongated. The epidermis covering them is somewhat thicker than in other parts of the skin.

In running over this series the infiltration is seen surrounding the vessels, which run down between the hairs, and the hair sheaths appear somewhat pouched, as in Case XII. The skin adjacent to the papule is not altogether normal, for the vessels are slightly enlarged and there are a few wandering cells in their neighbourhood. The epidermis is generally thicker than is normal, but there are no appearances of a vesicle any-

where to be seen. The openings of the sweat-ducts are slightly dilated, and the connective tissue of the corium is only slightly irregular in that portion included within the papule.

From Case XI. which had reached the acme of the disease, a piece of skin about 1 cm. square, containing a papule slightly larger than the other two already described, and which could be plainly seen, was taken from the left arm, just above the elbow-joint. Before excision the papule was marked with India ink, and the whole piece then placed in alcohol. Although more prominent than those of Cases XII. and X., the papule itself had not been scratched, but the adjacent skin, from previous irritation, had become somewhat harder and thicker than normal.

This piece was cut into a series of twenty-four sections beginning at the edge of the papule, and after staining with gentian violet they were mounted according to their order in Canada balsam.

The changes in this case are similar to those in the previous one. The infiltration is seen to start from the same place in the corium, and extends upwards surrounding the papillary vessels. In this papule there are no hairs, but there is a sudoriparous duct running through it, around which there is also a moderate degree of small cell infiltration. The papillæ are somewhat elongated, and the stratum corneum covering the papule slightly thickened. There are two sweat-glands lying almost directly under the primary infiltration which are unaltered. Surrounding them are seen a few wandering cells. In the skin adjacent to the papule the vessels are slightly enlarged, and here and there a few infiltration cells are seen near them. There is nowhere any appearance of a commencing vesicle, or of the scattered heaps of epithelial cells to be noticed further on. The fibres of the connective tissue of the corium, with the exception of those included in the papule which are slightly irregular, are not altered.

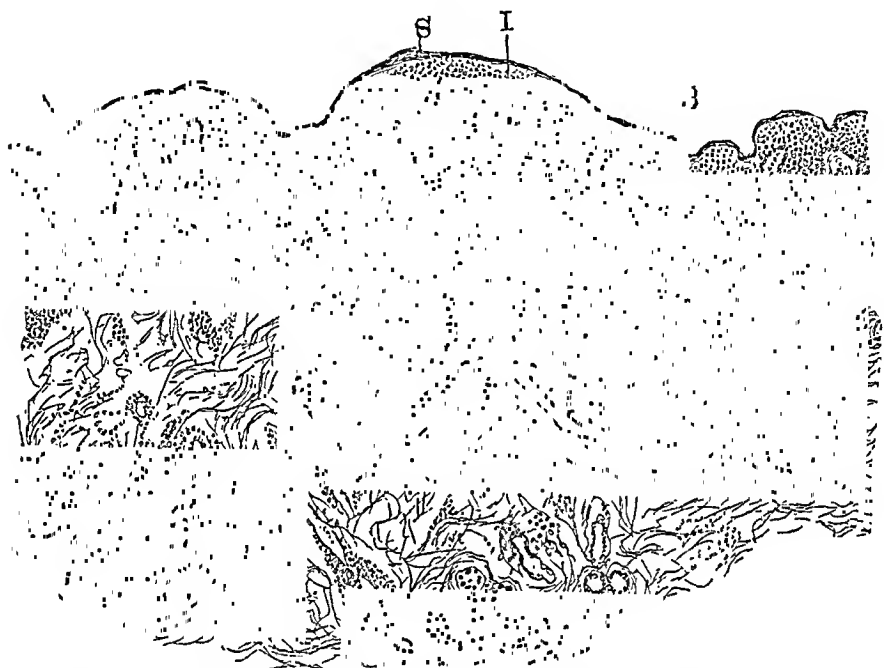
In the skin adjacent to the papule, the stratum corneum is somewhat thicker than normal, and there is a slight degree of infiltration scattered around the vessels of the papillæ and corium. (See Fig. 2.)

From Case II., which was at the acme of the disease, a piece of skin, $\frac{1}{2}$ cm. wide and $1\frac{1}{2}$ cm. long, and containing two papules, each about the size of the head of a pin, and which could be plainly felt and seen, was cut from the extensor side of the right humerus. There was no series made in this case, but the entire papules were included in the sections, and, after staining with carmine, Bismark brown, and gentian violet, they were all mounted, without however being arranged in any particular order. It required but little care to pick out the sections which came next to each other.

One of the papules is pierced by two hairs, which however run through its outer edge and not through its centre. There is a comparatively large amount of cell infiltration around the upper vessels of the corium and those running into the papillæ. This infiltration, independent of the hairs, and

not surrounding them, is seen to pass through the epidermis, between the layers of which a vesicle has formed, which also is not pierced by the hairs. This vesicle lies within the epidermis, between the stratum granulosum and stratum corneum, involving the former to a slight degree, and

Fig. 2.



The papule lies between A and B. I. Infiltration. S. Opening of sweat duct with gland underneath. (Oc. 3; ob. 4. Reichert.)

covering the middle portion of the papule. It is not more than half the circumference of the papule, for there are as many as fifteen papillæ included in the latter and only half that number are covered by the vesicle.

The vesicle is similar to those seen in other diseases (variola, herpes zoster, etc.), and its contents consist of the infiltration cells, which have come from the corium, with broken-down epithelium. This infiltration is seen passing through the different layers of the epidermis, and the cells can be followed into the vesicle itself. It is confined to that portion of the skin included in the papule, and does not extend downwards beyond the upper line of vessels running through the corium. The muscles are not hypertrophied, and the hair sheath is not altered.

The second papule, included within these sections, has the duct of a sweat gland running to the surface of the epidermis directly through its centre. The infiltration is seen to occupy the same place as in the first papule. It extends upwards, surrounding the sweat duct, passes through

the rete Malpighii, and between the same layers of the epidermis as in the one just described, and, surrounding the opening of the duct, a vesicle has formed, within which can be seen some of the infiltration cells. This vesicle is larger and more distinct than the former one, and its contents evidently more fluid than it, as the meshes are larger and the trabeculae

running across it longer. It does not, however, any more than the previous one, cover the whole surface occupied by the papule.

There are no hairs running through this papule, and the infiltration is confined to the upper portion of the corium, the papillae, and epidermis. The latter is thickened where it covers the papillae included within the papule.

In the adjacent skin there is a small amount of infiltration, surrounding sometimes the hair sheaths and sweat glands, but always surrounding the vessels. On the surface of the epidermis, surrounding the hair follicles and covering the openings of the sweat ducts, are seen in many parts of these sections a small collection of epithelial cells, which cling either to the hair or are attached to the ducts. They are simply scales of epithelium which have not fallen off. All along the lower layer of the rete Malpighii there is seen a marked increase in the amount of brown pigment contained within the cells. Itching had evidently been severe, as the macroscopic appearances of the skin showed, but the vesicles upon these papules were still intact.

In this case the papules were the direct result of the infiltration described, while all the other changes in the cutis and epidermis were secondary. (See Figs. 3 and 4.)

From Case III., which had reached the acme of the disease, a piece of skin, $\frac{1}{2}$ cm. square, was taken from the calf of the left leg. It contained

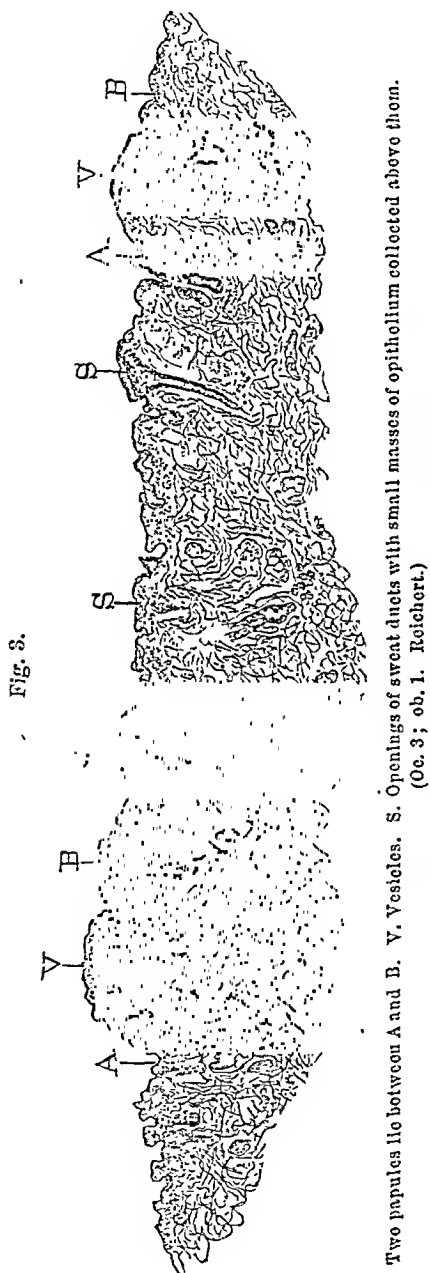
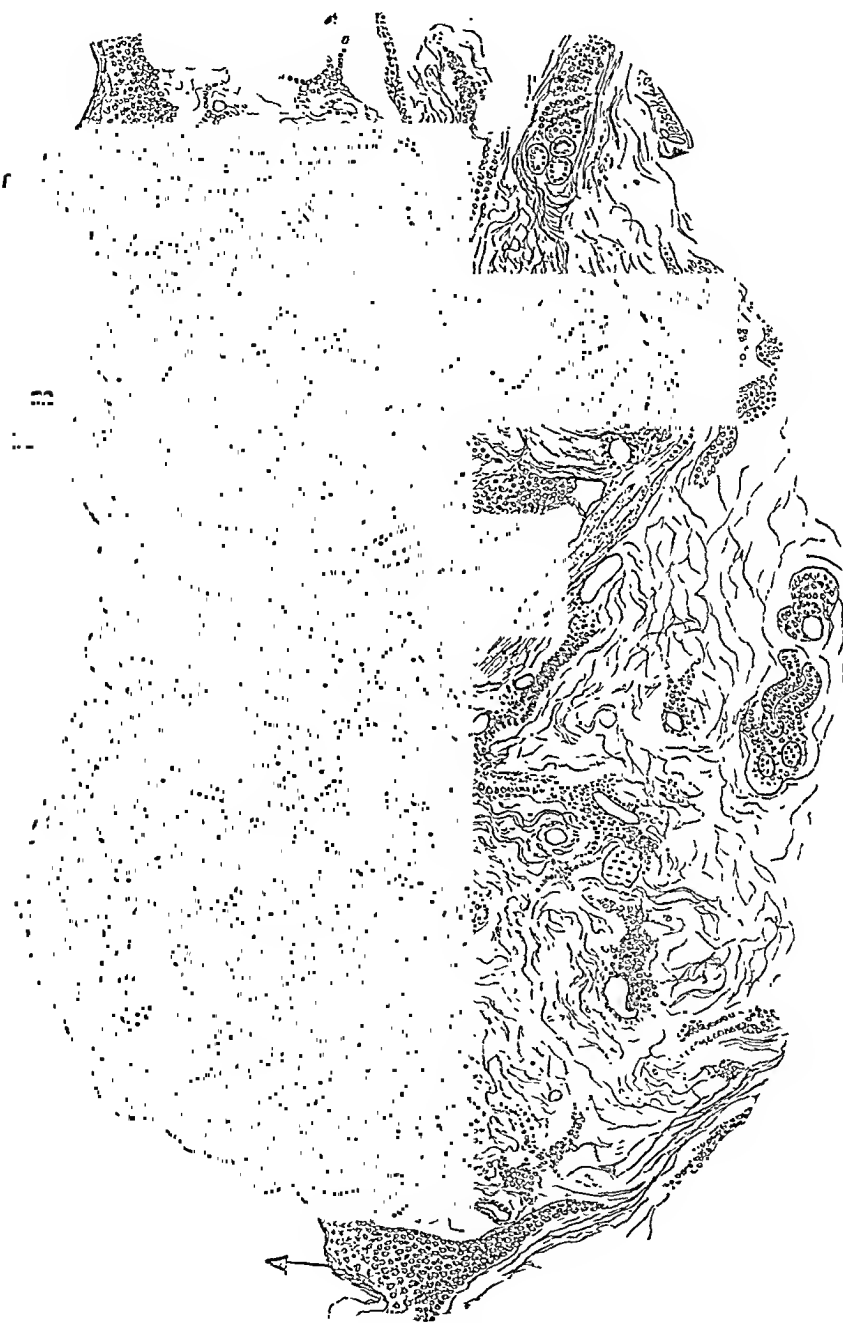


Fig. 3.

a papule the size of a pin head, which could be plainly felt and seen. A series of thirty sections was made, and they were mounted in regular



This figure represents one papule of Fig. 3 enlarged. The papule lies between A and B. V. Vesicle with infiltration underneath and a sweat duct running into it. Two hairs are seen, one with hypertrophied muscle, and both lying outside the infiltrated portion. S. Opening of sweat duct with small mass of epithelial cells. The same can be seen at H. H. Hair follicle. (Oc. 3; oh. 4. Reichert.)

order in Canada balsam after having been stained with gentian violet. The papule was pierced by a hair, and contained the duct of a sweat gland. All the sections presented the appearance so commonly seen in

chronic inflammations of the skin, and it was only from the greater thickness of the epidermis and the large amount of cell infiltration at one point in the sections, that the papule could be distinguished from the rest of the skin.

As in chronic dermatitis and eczema, there was general thickening of the rete Malpighii, increase in the quantity of pigment in its lower layers, collections of infiltration cells here and there, especially marked around the vessels, enlargement of the lymph spaces, with hypertrophy of the hair muscles. There were also seen at various points, as is so frequently the case even in normal skin, where the stratum corneum from any cause is thickened (lichen pilaris), curled up underneath the epidermis, encysted hairs.

There was no vesicle in this series, but at various points along the surface of the epidermis the same small heaps of sealy epithelium were seen which have already been described.

From Case IV. a piece of skin about $\frac{1}{2}$ cm. square, and containing a vesicle which had the appearance of belonging to a papule, was taken from the inside surface of the left foot. This piece was cut out so superficially that nothing but the vesicle itself with its upper and lower layers of epidermis was left. The sections made, therefore, could not have any bearing upon this subject.

From a papule on the extensor side of the left thigh, a hair was carefully pulled from its follicle with the epilator forceps. Almost the entire sheath came away with it. Under the microscope it was found to contain two hairs, and one of these was so much curled up that it was almost impossible to follow its course. The sebaceous gland filled with epithelium cells such as v. Baerensprung describes, was not found.

From Case V. in the acme of the disease, a piece of skin $\frac{1}{2}$ cm. wide and 1 cm. long, and containing a papule about the size of a millet seed, was cut from the extensor side of the left thigh. There was no series made in this case. The sections were stained in gentian violet and picrocarmine, and mounted in Canada balsam or glycerine. The papule was formed in the same manner as in the previous cases, by an infiltration commencing around the vessels of the corium and extending into the papillæ. Through the outer edge of one side runs the duct of the sweat-gland. A small vesicle has formed in the epidermis surrounding the sweat-duct as it passes through it. It is similar to those already described, but much smaller. Where the hairs pierce the epidermis it is pushed up, giving the impression that the stratum corneum resisted them as they passed through.

In these sections great care was taken to examine the substance called by Ranvier¹ eleidine, and for which the name of "kerato-hyaline" has been

¹ Sur une substance nouvelle de l'épiderme et sur le processus de keratisation du revêtement épidermique. *Comptes rendus*, 1879, t. 88, p. 1361.

proposed by Waldeyer,¹ for the purpose of comparing it with the amount contained in normal skin taken from the same situation.

It was found to be largely increased, but not to a greater extent than it was in other diseases in which the rete Malpighii and epidermis are infiltrated or thickened (*molluscum contagiosum*, *pemphigus*.) Where the epidermis was seen to be thickest, there the eleidine was increased proportionately, for instance, just underneath the vesicle and where the hairs passed through.

From Case VII. a piece of skin $\frac{1}{2}$ cm. wide and 1 cm. long, containing a papule, was cut from the extensor side of the left humerus. This papule was pierced by a hair, but the infiltration was more intense around the vessels in its neighbourhood than around its sheath. There was general thickening of the epidermis, but especially in that portion covering the papule. In the adjacent portions of the skin, the changes were present which have been so often ascribed to chronic inflammations.

From Case I., which on account of treatment had no appearance of the disease, a piece of skin $\frac{1}{2}$ cm. wide and $1\frac{1}{2}$ cm. long, was cut from the extensor side of the right humerus. A small amount of cell infiltration is seen lying around the vessels of the corium and the papillæ. The latter are somewhat elongated, there is an increase in the amount of pigment bodies in the lower layer of the rete Malpighii, the epidermis is thickened, the openings of the ducts are dilated and are covered in many places with small collections of scaly epithelium. The hair sheaths are pouched at the insertion of the muscles, and in many places encysted hairs are curled up underneath the epidermis. The *M. arrectores* are hypertrophied.

These changes are spread evenly throughout the skin, and there is no evidence of a central infiltration, as in those cases where there is a papule.

From Case IX., which on account of treatment had no appearance of papules or of scratching, a piece of skin $\frac{1}{2}$ cm. wide and nearly 2 cm. long, was cut from the extensor side of the right thigh. There was no scies made with this piece. The sections were mounted in glycerine or Canada balsam, after staining with earmine, picro-carmin, Bismark brown, and gentian violet. They all contained evidences of chronic inflammation.

In those sections stained with picro-carmin the eleidine, as in Case V. was seen to be increased. There was general thickening of the epidermis, and in many places the hairs were encysted.

From Case V. a piece of skin 1 cm. square and containing a papule, was taken from the extensor side of the right thigh. There was no scies made, and the sections were all placed either in chloride of gold, or hyperosmic acid, for the purpose of examining the nerve endings. Neither the tactile corpuscles nor the nerves themselves were seen to be altered.

¹ Untersuchungen über die Histogenese der Horngebilde insbesondere der Haare und Federn, 1881. Heule Celebration, Göttingen.

From Case VIII. a piece of skin about $\frac{1}{2}$ cm. wide and 1 cm. long and containing a papule, was cut from the extensor side of the left thigh. The sections were all placed either in ehloride of gold or hyperosmic acid. As in Case VI. no change was seen in the tactile corpuseles or the nerves themselves.

In making a summary of my own investigations, although acknowledging that I have found no changes which have not been described by others, exeeping the cleidine, yet I am forced to draw rather different conclusions regarding the formation of the papules, when considering them in their earliest and latest stages.

I consider that the papule is formed by an infiltration beginning around the upper layer of vessels of the corium, and that this infiltration extending upward surrounds the papillary vessels, enlarges the papillæ, thus pushing up the epidermis, which becomes thickened at an early stage above them, and at last penetrating it, forms within its layers a small vesiele containing serum, blood, and lymph-cells. The signs of infiltration surrounding the hair sheaths and sweat-ducts are secondary, and they play no espeecial part in the process. Their presenee in the papule is accidental, and it is certain that the primary changes in the skin are not in connection with them.

The colour of the papule at first does not differ from the rest of the surrounding skin, on aecount of the depth of the slight infiltration with which it begins. For the same reason, it is at first only felt, and not seen, as the infiltration has not extended high enough to push up the epidermis perceptibly, but is sufficiently great to give a feeling of knot-like hardness underneath it. I differ, therefore, entirely with Auspitz when he says that the papule does not belong to an inflammatory process. In fact, I consider the whole process due to an inflammation, and that all the signs of chronic dermatitis follow regularly, according to the length and duration of the disease, and the amount of scratching, which the itching, as a secondary symptom, causes.

Clinically the formation of the papule coincides with the foregoing description, for there is always noticed in the beginning of the disease, after careful investigation of the skin, a slight roughness, and a sensation as of running the hand or finger over small knots, covered with an intervening membrane. At this stage there is no itching. In fact, the itching does not begin until the infiltration has so far advanced that the papules are more distinct. If before this occurs the treatment is begun, no itching appears. This proves, as Kaposi says, that all the symptoms of the disease go hand in hand with the increase or decrease of the papules.

In looking over the work done by others, and comparing it with my own investigations, I find that they disagree more in the conclusions arrived at than in the general histological changes described.

I cannot agree with Hebra that the formation of the papule begins in

the layers of the epidermis, and that the itching is due to fluid contained within the vesicle; for, in those papules taken from the earliest state of the disease which I examined, there is no sign of a change in the epidermis. This is not affected until the infiltration has become more general, and in several cases the itching was present before a *vesicle was seen, macroscopically or microscopically*. Nor can I agree with Derby and Auspitz that the papule is always pierced by a hair, for, in several of the papules examined by me, there was no hair to be seen.

I must also disagree with v. Baerensprung, that they are due to a collection of epithelial cells within the openings of the sebaceous ducts; for this collection of epithelial cells does not occur until the stratum corneum is so affected that a proliferation of its cells takes place, causing an extra formation of scaly epithelium, which generally falls off, but which often clings to the hair-follicles and openings of the sweat-ducts in the form of small heaps. These masses have nothing to do with the papule, and may occur in any disease, causing chronic thickening of the epidermis.

The investigations of Neumann, Gay, and Simon coincide more nearly with my own, but I do not agree with them that the infiltration begins in the papillæ. These are affected later, and the part of the cutis, where the inflammation first occurs, is underneath them, around the vessels of the corium, and where they send off smaller branches to the papillæ.

If asked what was the cause of the inflammation starting the formation of the papule, I must honestly answer, I do not know. Auspitz is satisfied with the hypothesis, that it is an idio-neurosis, but his conclusions are drawn without a thorough consideration of the pathology of the papule. He takes it for granted there is no question of a primary inflammatory condition, a statement which is utterly at variance with my own microscopical investigations, and those of others. He seems to me to begin at the wrong end of the papule, for, as I have shown, the hypertrophy of the hair muscles does not occur any sooner in prurigo than in some other affections where there are no papules. As, however, they are not always in connection with a hair, it is not necessary to further argue this point.

Late investigations into the condition of the nerve endings in ichthyosis¹ and vitiligo² have shown them to be altered. Still the question immediately suggests itself whether these changes were not the result of disease rather than the cause. Would there not be changes in all parts of the skin, as the natural result of a chronic diseased condition? Some authors think that one proof of a disease having a nerve origin would be its production by the use of drugs known to affect them. The description by Charcot and Vulpian of a pruriginous eruption, produced by nitrate of

¹ Leloir, *Alteration des nerfs cutanés dans un cas d'ichthyose congenitale*. Comptes Rend., t. 89.

² Leloir et Chabrier, *Alterations des nerfs dans un cas de vitiligo*. Comptes Rend., t. 89.

silver, would carry much weight with it, if others had confirmed it, or had the symptoms coincided with those of prurigo, but as it stands it is unimportant, and proves nothing.

Until more thorough proof based upon careful pathological investigations is produced, I cannot look upon prurigo as a neurosis. The appearance of the papules, caused by a primary infiltration and inflammation before the itching, the peculiar localization of the disease, the negative effect produced by "nervines" therapeutically, the distinct and characteristic eruption which distinguishes it from other diseases, the fact that a simple itching (pruritus) never runs into it, speak altogether against this hypothesis.

The connection of many diseases of the skin with albuminuria has often been noticed, so that prurigo does not stand alone in this respect. Where they occur together, the albuminuria, as in the case related in this paper, generally disappears with the improvement in the prurigo symptoms. There are, however, so many cases of prurigo which have no connection with a disease of the kidneys, that the two occurring together is to be explained rather as an accident, than that they have any direct bearing upon each other.

Hebra and all other observers, except Klemm, consider the disease most frequent in ill-nourished and ill-cared-for people, but to explain a disease by saying it is due to a "bad state of the system" is illogical and unscientific, and therefore I must consider that the first cause which produces the inflammation in prurigo is still unexplained.

I cannot close this article without expressing my warmest thanks both to Professor Chiari and to Professor Pick for the kind assistance which they have rendered me while investigating this subject, and for the friendly interest which they have manifested in all my work during my stay in Prague.

PRAGUE, June 22, 1883.

ARTICLE III.

EXCISIONS OF THE TARSUS, WITH A REPORT OF TWO SUCCESSFUL REMOVALS OF THE ENTIRE TARSUS. By P. S. CONNER, M.D., Prof. of Anatomy and Clinical Surgery, Medical College of Ohio, etc.¹

ADMIRABLY adapted as is the foot to sustain weight, diffuse force, and secure ease and quickness of movement, it is, in its proximal half at least, peculiarly liable to disease and the extension of inflammation from part to part. Placed where it must, of necessity, be subjected to violent jars and

¹ A paper read before the American Surgical Association, at its meeting at Cincinnati, Ohio, June 1, 1883.

severe twists, every opportunity is afforded for the occurrence of limited blood-extravasations in its bones, and of traumatic synovitis in its joints.

Its skeleton is made up almost entirely of cancellous tissue, covered in by closely adherent periosteum, that blends so intimately with the ligaments of the numerous articulations that it may, surgically considered, be regarded as a single sheet inclosing the whole tarsus.

It is crossed by numerous tendons and overlain by a definite though not very thick sheet of connective tissue, so that thecal and fascial inflammations may readily, by contiguity, be carried over to it.

In those who, by possession of the *ignotum quid*, are predisposed to the so-called strumous affections, the frequently occurring, usually slight, traumatisms may readily be followed by simple inflammation, or by the deposit of tubercle in the bones, the synovial membranes, or the peri-articular structures.

Specific periostitis or gumma may be here located, to produce the same effects as elsewhere. Lastly, external violence, contusions, cuts, compound fractures (gunshot or other), may be the developing cause of caries or necrosis.

Little wonder is it then, that tarsal disease is of frequent occurrence, or that it is at times found to affect a large portion or the whole of this section of the foot.

When thus extensive, what shall be done for its relief? Rest, compression, and stimulating or sedative applications (always proper in the beginning, and at times securing the best of results) are very likely to fail in arresting the progress of the disease, which more or less rapidly goes on to the destruction of the part.

When such has been produced, when the peri-articular structures are greatly thickened, abscesses have formed, and numerous sinuses exist leading down to dead bone, surgical interference is limited to: 1. The opening of the abscess cavity, and the informal removal of carious or necrosed tissue, with or without deep cauterizations or such local stimulant applications as shall tend to secure more healthy and reparative action; 2. Amputation, usually at or above the ankle-joint; and, 3. The methodical excision of such and so many of the tarsal bones as are unhealthy.

The first method in one form or another has long been employed, and in the less severe cases may be expected to often, perhaps generally, result favourably.

It is under this head that we must place the use of the actual cautery, so highly commended by Ollier and others of the French surgeons; the *évidement* of Sedillot; and the gouging and oakum-sewn method of our distinguished Fellow, Dr. Sayre.

By surgeons generally, amputation through the leg or at the ankle has been and still is regarded as much to be preferred to any more conservative treatment.

Such operation, it is claimed, is less likely to be followed by death from septic infection, or as the result of protracted and profuse suppuration; and leaves the patient in a better local condition, more able by the aid of an artificial limb to move about and earn a livelihood.

But there have been reported from time to time, especially during the last twenty years, cases of extensive formal excisions, the history and end-results of which compel a reconsideration of the alleged dangers and disadvantages attending an attempt to remove the diseased and preserve the healthy part of the foot.

Such attempt, it has been held, may cause death, at first or later; will very likely be followed by a return of the disease in the parts left; and even if successful as respects life, must leave a useless foot, if not one actually an innumbrance.

Before proceeding to determine, if possible, the correctness or incorrectness of these views by an analysis of the 108 excisions of two or more bones which I have been able to collect, permit me to briefly report two cases in each of which removal of the entire tarsus was recovered from, and a very serviceable foot secured.

CASE I.—A. S., Alsatian, æt. 39. First seen July 18, 1875. For about two years had had disease of the right tarsus, following, as claimed, a slight injury upon the outer side of the foot.

General condition bad, consequent upon suffering and profuse suppuration and a very recent attack of erysipelas extending up to the middle of the thigh. The posterior half of the foot was much enlarged, and through four openings over the ankle and heel the probe could be readily passed into carious bone.

Excision being determined upon, on the following day, July 19, 1875, the entire tarsus, every bone of which was more or less diseased, was removed through an external lateral incision, extending back to the outer border of the tendo Achillis. The upper articular surface of the astragalus, though healthy, was taken away with the rest of the bone, but the malleoli were left untouched. The resulting cavity was lightly packed with carbolized oakum, and the limb placed in a fracture-box.

A high temperature (105° F.) was noted at the end of the first twenty-four hours; but thirty-six hours later, Dr. Schwagmeyer, who had the immediate care of the case, reported to me: "Patient quite comfortable, very little fever, more appetite, tongue moist, complains of but little pain, has had several hours quiet sleep." From this time on, the progress toward recovery was steady, and in a little less than two months the wound was entirely closed.

It is, perhaps, a significant fact, with reference to the cause of the tarsal disease, that just before this complete cicatrization occurred, the man had quite a severe acute periostitis of the *left* tibia in its upper third, which soon disappeared under the administration of full doses of the iodide of potassium.

This case, so far as I have been able to ascertain, was the first in which the entire tarsus was taken away.

In Jaesehe's case, which was reported nine years previously, there was left of the os calcis, "the posterior part of the crust in form of half an egg-shell," to which the tendo Achillis was attached.

At the present time the man (not using even a cane) walks firmly and rapidly without limp, and can easily and quickly go up and down stairs, or climb up on to his wagon-seat. There is a half-inch shortening of the leg; the lateral movements of the foot are slightly limited; and the range of flexion and extension of foot on leg is lessened about one-fourth. The sole is flattened, but there is no lateral deviation of the foot or elevation of border. No re-formation of bone seems to have taken place. The foot is three inches shorter than its fellow (7 in.—10 in.); the circumference at instep level is one-fourth inch greater (9 in.— $8\frac{3}{4}$ in.); measured over the heel and just below the malleoli the circumference is one-fourth inch less ($11\frac{3}{4}$ in.—12 in.).

CASE II.—E. S., æt. 20, German. First seen in Cincinnati Hospital April 1, 1876. Had had for over two years disease of the right tarsus. Had already been twice operated upon by Dr. B. F. Miller, the "scaphoid and most of the astragalus" having been taken away in April, 1875, and three and a half months later "some small pieces of necrosed bone and a part of the os calcis." Examination of the foot showing that much, if not all, of what remained of the tarsus was carious, on the 8th of April I removed the whole of it through an external lateral incision.

The after-treatment was similar to that of Case I. As in that case there was an early rise of temperature (103° F.) at the end of the first twenty-four hours, with quick decline. Healing went on steadily, but slowly, and it was nearly six months before the man was able to readily move about without crutches.

Seven and a half months after the operation he could walk very well, and was doing duty as a nurse in the hospital ward. He now walks with ease and quite rapidly; never uses a cane; can run up and down stairs; and says that, so far as he can tell, the ankle movements are as good as ever. Their range does not seem to be any less than that of the sound ankle. Lateral movement is a little restricted. Owing undoubtedly to too great use of the foot soon after passing from under my observation, the leg bones have been crowded downwards and inwards; but no elevation of the outer border of the foot has taken place. The leg is shortened three-fourths of an inch, and the foot two and a half inches (7 in.— $9\frac{1}{2}$ in.). The instep circumference is one and a quarter inch less ($7\frac{1}{4}$ in.— $8\frac{1}{2}$ in.); that over heel and below the malleoli two inches less ($9\frac{1}{2}$ in.— $11\frac{1}{2}$ in.); that at level of base of toes one inch less ($7\frac{1}{4}$ in.— $8\frac{1}{4}$ in.) than the like measurements of the left foot.

Satisfactory as has been the end-result in each of these two exeisions, has it been merely surgical good fortune, or have we a reasonable prospect of securing the like in similar conditions of the foot? Though the number of operations tabulated is limited, it is yet, I believe, sufficiently large to warrant the deducing therefrom of certain general conclusions; especially since they have been made by many operators in various places and under diverse conditions, as respects time, age, and personal character.

Excision of nearly the entire Tarsus with part of Metatarsus.

No.	Operator.	Authority.	Sex.	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Usefulness of foot.	Cause of death.	Remarks.
9	Kappeler	Op. cit.	F.	46	1877	Caries	Entire tarsus with the exception of part of os calcis. Fifth metatarsal bone.	R.	Fair	.....	"With the aid of a cane walks very well." Osteitis in other foot.
Total number of cases, 1. Recoveries: fair, 1.											

Excision of Posterior Tarsus.

10	Watkey	London Lancet, July 1, 1848.	M.	23	1847	Caries	Posterior tarsus with the mallocl.	R.	Very good	.....	Healed in four weeks.
11	Ring	Hancock, Anatomy and Surgery of Human Foot, p. 431.	F.	13	1855	Caries	Posterior tarsus.	R.	Good	.....
12	Heyfelder, J. F.	Heyfelder's Table.	M.	17	1859	Caries	Posterior tarsus.	R.	Failure	.....	Amputation on 24th day.
13	Cabot	Records Med. Imp. Soc. (Boston), v. 4, p. 61.	M.	Adult	1859	Necrosis	Posterior tarsus.	..	Uncertain	.....	At time of report "patient was doing well."
14	Whitcomb, J. C.	Med. and Surg. Hist. War of Rebel'n. Surg. Vol. part 3, p. 592.	M.	26	1863	Gunshot wound	Posterior tarsus.	R.	Good	.....	Eighteen years later the limb was shortened 2½ inches.
15	Morton, Thos. G.	Amer. Jour. Med. Sci., April, 1871, p. 424.	M.	13	1869	Caries	Posterior tarsus.	R.	Very good	.....	"Very perfect recovery" as respects motion and usefulness. About 1 inch shortening.
16	Humphrey, F. A.	St. Barth. Hosp. Rep., vol. x, p. 377.	M.	9	1874	Caries	Posterior tarsus.	R.	Very good	.....	"With a high-heeled boot he can, without a stick," 1½ inch shortening of leg.
17	Tilling	Mod. & Surg. Hist. War of Rebel'n. Surg. Vol. part 3, p. 611.	M.	23	1876	Gunshot wound	Posterior tarsus.	D.	....	Gangrene—on 10th day.	Amputation on 5th day.
Total number of cases, 8. Recoveries: very good, 3; good, 2; uncertain, 1; failure, 1 = 7. Deaths, 1.											

Excision of part of Posterior Tarsus with Ankle-joint.

18	Schüller	Deutsche Zeitschrift f. Chirurg. 1878, p. 303, et seq.	M.	10	1876	Caries	Ankle-joint with greater part of astragalus and of os calcis.	R.	Very good	Same patient: operation on one side in September, on the other in November. Fifteen months later patient walked about 7½ miles without difficulty.
19	Ilmeyer	Deutsche Zeitschrift f. Chirurg. 1878, p. 303, et seq.	M.	10	1876	Caries	Ankle-joint with greater part of astragalus and of os calcis.	R.	Very good		

Total number of cases, 2. Recoveries: very good, 2.

Excision of Posterior Tarsus with part of Anterior Tarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Info.	Usefulness of foot.	Cause of death.	Remarks.
20	Teale	Med. Times and Gaz., May 27, 1854.	M.	24	1853	Caries	Posterior tarsus and cuboid.	R.	Fair	.....	"Walked about with the assistance of a stick." Ankle motion good at expiration of ten months.
21	Teale	Med. Times and Gaz., Oct. 13, 1855, and Hancock, op. cit. p. 433.	F.	24	1855	Caries	Posterior tarsus, cuboid, and scaphoid.	R.	Very good	.....	Could do servant's work after six months. Could walk without stick.
22	Swain	British Med. Journ., Jan. 7, 1871.	M.	11	1864	Caries	Ankle-joint, posterior tarsus, and part of scaphoid and of cuneiforms.	R.	Very good	.....	Foot "well nourished and quite painless," 1½ inch shortening. "Can walk any reasonable distance without distress."
23	Lehman	Deutsche Klinik, 1870, p. 10.	M.	40	1867	Caries	Ankle-joint, posterior tarsus, and scaphoid.	R.	Very good	.....	After ten months patient was completely satisfied with the condition of his foot.
24	Fayrer	Med. Times and Gaz., July 31, 1869.	M.	9	1869	Caries	Posterior tarsus and scaphoid.	R.	Uncertain	.....	At time of report could put foot on the floor, and bear considerable weight upon it. "In fair way to make excellent recovery."
25	Goldammer	Berl. Klin. Wochenschr., 1871, 8, p. 151.	M.	Adult	1870	Gunshot wound	Posterior tarsus and scaphoid.	R.	Good	.....	Subperiosteal resection. Extensive reformation of bone. Some limp in walking. No pain.
26	Krohn	Kappeler's Tablo.	M.	10	1871	.....	Posterior tarsus and internal malleolus.	R.	Good	.....	Lived three months.
27	Kappeler	Op. cit.	M.	8	1870	Caries	Posterior tarsus, scaphoid, and part of cuboid.	D.	....	Any old disease of liver and spleen.	
28	Mikulicz	Langenbeck's Archiv f. Klin. Chir., B. 20, 1881, S. 494 et seq.	M.	23	1880	Syphilitic ulceration of soft parts of heel.	Ankle-joint, posterior tarsus, and proximal half of scaphoid and cuboid.	R.	Very good	.....	Osteoplastic resection. After fourth month could walk without shoe, and bear the entire weight of body on foot.
29	Conner	.....	M.	52	1882	Necrosis	Posterior tarsus and part of cuboid.	D.	....	Any old disease of intestines	Lived three months.

Total number of cases, 10. Recoveries: very good, 4; good, 2; fair, 1; uncertain, 1 = 8. Deaths, 2.

Excision of part of Posterior Tarsus with part of Anterior Tarsus.

No.	Operator.	Authority.	Sex.	Age.	Date.	Causo.	Bones removed.	Result as to Life.	Cause of death.	Remarks.
30	Durand	Heyfelder's Table.	M.	14	1745	Caries	Astragalus, part of os calcis, cuboid.	R.	.....	Afterwards served as a soldier for thirteen years.
31	Liston	Edinb. Med. Journ., Jan. 1821.	F.	12	1818	.....	End of tibia, astragalus, scaphoid, and two cuneiforms.	R.	.....	"Complete and lasting cure without much deformity or lameness."
32	Liston	Blackman's Mott's Velpaen, v. 2, p. 483.	..	....	1832	.....	A part of the astragalus, scaphoid, and two cuneiforms.	R.	.....	"Did not succeed."
33	Jaeger	Heyfelder's Table.	..	....	1832	Caries	Astragalus and scaphoid.	R.	.....
34	Robert	Vierleijahrchrift f. d. Paktische Heilkunde, 1855, B. 3, p. 1, et seq.	F.	34	1851	Caries	Os calcis and cuboid.	R.	.....	Relapso 1½ years later. Death from phthisis.
35	Textor	Heyfelder's Table.	M.	23	1852	Caries	Ankle-joint, astragalus, part of os calcis, scaphoid.	R.	.....
36	Robert	Op. cit.	M.	58	1852	Caries	Anterior half of os calcis, cuboid, and scaphoid.	R.	.....
37	Robert	Op. cit.	F.	35	1853	Caries	Anterior half of os calcis, greater part of cuboid.	R.	.....	"Useful foot."
38	Cetton	Med. Times and Gaz., June 16, 1855.	M.	30	1855	Caries	Ankle-joint, astragalus, part of os calcis, of scaphoid, and of the three cuneiforms.	R.	.....	Recovery in ten weeks.
39	Cock	Med. Times and Gaz., Feb. 21, 1857.	F.	21	1856	Caries	Part of astragalus and of os calcis with scaphoid, cuboid, and one cuneiform.	R.	.....	At time of report, some dead bone remaining, and foot much misshapen.
40	Bradford, J. T.	Gross' "Surgery," vol. ii. p. 1087.	M.	15	1857	Caries	Os calcis, small part of astragalus and cuboid.	R.	.....	"Excellent recovery."
41	Housser	Deutsche Klinik, 1860.	..	....	1860	Caries	Os calcis, scaphoid, and first cuneiform.	R.	.....	Subsequent amputation.
42	Humphry, G. M.	Med. Times and Gaz., April 27, 1861.	M.	12	1860	Caries	Ankle joint, astragalus, and scaphoid.	R.	.....	Subsequent amputation.
43	Langenbeck	Vincent, These de Paris, 1876, p. 73.	F.	11	1861	Caries	Os calcis, cuboid, part of astragalus.	R.	.....	Complete regeneration of bone.
44	Billings	Med. & Surg. Hist. War Reb. Surg. Vol. part 3, p. 638.	M.	52	1862	Incised wound	External malleolus, astragalus, and part of scaphoid.	R.	.....	"Could walk with aid of cane."
45	Gant	London Lancet, July 23, 1864.	M.	60	1862	Caries	Os calcis, cuboid, and part of third cuneiform.	R.	.....	"Ultimately walked without crutch or cane, and had a sound and useful foot."
46	Holmes, T.	London Lancet, May 27, 1865, p. 560.	F.	10	1863	Caries	Astragalus and scaphoid.	R.	.....	"Can walk perfectly, limp hardly perceptible."

Excision of part of Posterior Tarsus with part of Anterior Tarsus.—Continued.

No.	Operator.	Authority.	Sex.	Age.	Date.	Causo.	Bones removed.	Result as to Life.	Usefulness of foot.	Causo of death.	Remarks.
47	Humphry, G. M.	London Lancet, Aug. 6, 1864	M.	Youthful	1864	Caries	Part of astragalus, part of os calcis, part of cuboid, part of first cuneiform, with whole of scaphoid	R.	Very good	.....	Four years later could run about as though nothing had happened.
48	Humphry, G. M.	London Lancet, Aug. 6, 1864	..	....	....	.....	Ankle-joint, astragalus, and scaphoid	R.	Failure	.....	Subsequent amputation.
49	Shinn	Kappeler's Table.	..	....	1866	.....	Ankle-joint, astragalus, anterior part of os calcis, scaphoid, and cuboid.	R.	Good	.....	"Happy result."
50	Mulvaux	London Lancet, Nov. 6, 1869.	M.	29	1866	Caries	Ankle-joint, astragalus, $\frac{1}{2}$ of os calcis, $\frac{3}{4}$ of scaphoid.	R.	Very good	.....	"Walks without limping."
51	Sayre	Bellvue Hosp. Reports, 1870, p. 116.	M.	27	1868	Caries	Part of astragalus, great part of os calcis, scaphoid and other bones.	R.	Very good	.....	"Walks without limping."
52	Jayaker	Med. Times and Gaz., Oct. 30, 1879.	M.	30	1869	Caries	Part of astragalus, scaphoid, and two cuneiforms.	R.	Good	.....	Sound and useful limb.
53	Langenbeck	Langenbeck's Archiv f. Klin. Chir., B. 16, 2, p. 246.	M.	Adult	1870	Gunshot wound	Ankle-joint, astragalus, part of os calcis, cuboid.	R.	Very good	.....	"Walks for hours without limping."
54	Walter, A. G.	Culbertson's Table.	F.	10	1870	Caries	Ankle-joint, astragalus, almost all of the os calcis, scaphoid, part of cuboid.	R.	Very good	.....	Foot "useful to the fullest extent."
55	Walter, A. G.	Culbertson's Table.	F.	43	1872	Caries	Greater part of astragalus and of os calcis, part of cuboid and of scaphoid.	R.	Very good	.....	Less than one inch shortening.
56	Levis	Phil. Med. Times, vol. 1, p. 310.	M.	17	1873	Caries	Ankle-joint, astragalus, part of scaphoid and of cuboid.	R.	Uncertain	.....	"Perfect usefulness of the joint and foot."
57	Nicholls	Holmes's "System of Surg.," Am. ed., vol. III, p. 236.	..	....	....	.....	Almost the entire astragalus, os calcis, part of scaphoid.	R.	Very good	.....	Seven months after the operation patient was "able to bear some weight on the foot;" was using crutches.
58	Holman, C. D.	Med. News (Phila.), Feb. 24, 1883.	F.	20	1882	Caries	Astragalus, nearly the whole of os calcis, nearly all the tarsal bones.	R.	Failure	.....	Two operations. "Patient can walk quite well, and with a hardly perceptible limp." Amputation two months later, though healing was progressing favourably.

Total number of cases, 29. Recoveries: very good, 14; good, 5; fair, 2; failures, 6; uncertain, 2 = 23.

Excision of part of Posterior Tarsus with Anterior Tarsus and part of Metatarsus.

No.	Operator.	Authority.	Sex	Age.	Date	Cause.	Bones removed.	Result as to Life.	Cause of death.	Remarks.
59	Dunn	Med. Chir. Trans., vol. XI. p. 357.	M.	14	1816	Caries	Very small part of astragalus, anterior tarsus, bases of 2d and 3d metatarsals.	R. Very good	.....	Bones removed at two operations. 4 years later 1½ inch shortening. In less than a year after the operation the boy walked 9 miles in one day.
60	Lauenstein	Proceedings of 12th Congress of German Surgeons.	F.	54	1881	Caries	Part of os calcis, anterior tarsus, bases of 4th and 5th metatarsals.	R. Very good	.....	Almost imperceptible limp; ½ inch shortening of foot. Some reproduction of bone.
Total number of cases, 2. Recoveries: very good, 2.										

Excision of part of Posterior Tarsus, part of Anterior Tarsus, and part of Metatarsus.

61	Moreau, St.	Moreau, Resection des Os, p. 110.	M.	40	1788	Caries	Part of os calcis, cuboid, 3d cuneiform, and part of 4th and 5th metatarsals.	R. Very good	.....	"Perfect cure."
62	Beck	Langenbeck's Archiv f. Klin. Chir., B. 5, p. 238.	M.	17	1864	Caries	Os calcis, cuboid, and two metatarsals.	R. Very good	.....	Could do mountain climbing "without inconvenience."
63	Czerny	Volkmann's Klin. Vortr. No. 76.	M.	17	1874	Caries	Os calcis, cuboid, bases of 4th and 5th metatarsals.	R. Uncertain	.....	Under treatment at time of report.
Total number of cases, 3. Recoveries: very good, 2; uncertain, 1 = 3.										

Excision of Anterior Tarsus.

64	de Housse	Thomae, Thèse de Paris, 1853, No. 253.	M.	36	1775	Caries	Anterior tarsus.	R. Very good	.....	Healed in two months; regeneration of bone. Walked "six leagues a day without aid and without fatigue." Two operations.
65	Jaesche	Langenbeck's Archiv f. Klin. Chir., 1866, B. 5, p. 162.	M.	51	1833	Caries	Anterior tarsus.	D.	Cirrhosis of liver and pericarditis	Two operations. Lived 14 months.
66	Bryant	"Surgery," p. 832. 3d Amer. ed.	M.	8	....	.....	Anterior tarsus.	R. Very good	.....	"Excellent foot."
67	Sociu	Deutsche Zeitschr. f. Chir., 1879, p. 350 et seq.	M.	15	1879	Caries	Anterior tarsus.	R. Good	.....	Healed after ten months.

Total number of cases, 4. Recoveries: very good, 2; good, 1; death, 1 = 4.

Excision of Anterior Tarsus with Metatarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Useful- ness of foot.	Cause of death.	Remarks.
68	Conner	Amer. Journ. Med. Sci., July, 1873.	M.	31	1874	Charles	Anterior tarsus, ontiro metatar- sus, except small part of 1st metatarsal.	D.	Pyæmia	Two operations sixteen days apart. Lived eleven days after second opo- ration.
Total number of cases, 1. Deaths, 1.										

Excision of part of Anterior Tarsus with Metatarsus.

69	Kappeler	Op. cit.	F.	26	1868	Charles	Cuboid, 3 cuneiforms, and all the metatarsals.	R. Very good		
Total number of cases, 1. Recoveries: very good, 1.										

Excision of Anterior Tarsus with part of Metatarsus.

70	Moreau, Jr.	Blackman's Mott's Vol- ume, 2, 483.	..	....	....	.....	Anterior tarsus, bases of 3d, 4th, and 5th metatarsals.	R.	Failure	Charles reappeared in other bones be- fore elutriation took place.
71	Chumpon	Mous-n, Thèse de Stras- bourg, 1863, 2d ser., No. 718.	..	....	1839	Charles	Anterior tarsus, with bases of 3d, 4th, and 5th metatarsals.	R.	Failure	Charles reappeared "in other bones of the foot before elutriation took place."
72	Laugier	Thomas, Thèse de Paris, 1853, p. 253.	F.	47	1853	Charles	Anterior tarsus, bases of 2d, 3d, and 4th metatarsals.	D.	....	"Examination of the unelutriated foot showed that the ultimate result would doubtless have been satis- factory."
73	Bigelow, H. J.	Records Med. Imp. Soc. M. (Boston), v. II, p. 312.	M.	44	1855	.....	Anterior tarsus, with bases 2d and 3d metatarsals.	D.	....	Lived 4½ months. "Health improved for 3 months, when his mind sud- denly gave way; tendency to diar- rhea supervened, and he died of tuberculous disease."
74	Watson, P. H.	Edinb. Med. Jour., May, 1871.	M.	19	1870	Charles	Anterior tarsus, with bases of metatarsals.	R.	Very good	"Walked almost without defect."
75	Watson, P. H.	Op. cit.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Good	
76	Watson, P. H.	Op. cit.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Good	
77	Watson, P. H.	Op. cit.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Good	
78	Watson, P. H.	Op. cit.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Good	

Excision of Anterior Tarsus with part of Metatarsus.—Continued.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to Life.	Useful- ness of foot.	Cause of death.	Remarks.
79	Watson, P. H.	Edinb. Med. Journ., May, 1874.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	R.	Failure	.....	Subsequent amputation.
80	Bruns	Langenbeck's Archiv f. Klin. Chir., B. 19. s. 658.	F.	36	1874	Caries	Anterior tarsus, with bases of metatarsals.	R.	Uncer- tain	.....	Discharged in 7 weeks. "Steps on foot without difficulty."
81	Dawson	Cincinnati Clinic, Jan. 1, 1876.	F.	6	1874	Caries	Anterior tarsus, with bases of metatarsals.	R.	Very good	.....	Result not stated. Subperiosteal operation.
82	Watson, P. H.	Edinb. Med. Journal, April, 1875.	..	....	....	.....	Anterior tarsus, with bases of metatarsals.	..	....	.....	Wound firmly healed. Died of typhoid fever 6 months after the operation.
83	Socin	Loc. cit.	F.	9	1879	Caries	Anterior tarsus, with bases of metatarsals.	R.	Uncer- tain	.....

Total number of cases, 14. Recoveries: very good, 2; good, 4; failure, 3; uncertain, 2 = 11. Deaths, 2; result unknown, 1.

Excision of part of Anterior Tarsus.

84	Meyer	Heyfelder's Table.	F.	37	1845	Caries	Scaphoid, 1st and 2d cuneiforms.	R.	Uncer- tain	.....	"Partial success."
85	Raynor	Hancock, Anat. and Surg. Human Foot, p. 439.	M.	16	1845	Caries	3 cuneiforms.	R.	Uncer- tain	.....	"Partially successful, but the patient died some months afterwards of disease of his lungs."
86	Skey	London Lancet, May 28, 1853.	M.	18	1853 } 1859 }	Necrosis	Greater part of the second row of tarsal bones.	R.	Uncer- tain	.....	Two operations.
87	Bryant	"Surgery," p. 982, 3d Am. ed.	..	....	....	.....	Cuboid, and three cuneiforms.	R.	Very good	.....	"Excellent foot."
88	Owens	Culbertson's Table.	M.	56	1867	Necrosis	Cuboid, external and middle cuneiforms.	R.	Good	.....	"Good use of limb and foot."
89	Brune	Langenbeck's Archiv f. Klin. Chir., B 19, 658.	M.	17	1875	Caries	Cuboid and 3d cuneiform	D.	....	Amyloid disease of kidneys, spleen, and intes- tines	Died in ten days.
90	Socin	Loc. cit.	F.	27	1875	Caries	Scaphoid and 2 cuneiforms.	R.	Good	.....	After several years complete healing.
91	Huetter seq.	Deutsche Zeitschr. f. Chir., 1878, p. 303 et seq.	M.	23	1876	Caries	Cuneiform bones and part of cu- boid.	R.	Fair	.....	Discharged well in 2½ months. Walked with cane. Regeneration of bone.

Total number of cases, 8. Recoveries: very good, 1; good, 2; fair 1; uncertain, 3 = 7. Deaths, 1.

Excision of part of Anterior Tarsus with part of Metatarsus.

No.	Operator.	Authority.	Sex	Age.	Date.	Cause.	Bones removed.	Result as to		Cause of death.	Remarks.
								Life.	Usefulness of foot.		
92	do la Motte	Monsau, Thèse de Strasbourg, 1863, 2d ser., No. 715.	..	....	....	Necrosis	2d and 3d cuneiforms and part of the 5th metatarsal.	R.	Good	.....	Healed within three months.
93	Bruns	Kappeler's Tablo.	..	....	1849	Caries	1st and 2d cuneiforms; 1st and 2d metatarsals.	R.	Uncertain	.....	Healed by first intention, and 1 month later patient walked without crutch.
94	Massareni	Kappeler's Tablo.	..	....	1852	Caries	1st and 2d cuneiforms; 1st metatarsal.	R.	Good	.....
95	Smith	Hoyfelder's Table.	..	....	1856	Caries	2d and 3d cuneiforms; 4th and 5th metatarsals.	R.	Good	.....
96	Küchler	Deutscho Klinik, 1859, No. 41, p. 413.	M.	20	1857	Caries and necrosis	1st and 2d cuneiforms; 1st and 2d metatarsals.	D.	....	Dropsy (Amyloid disease?)	
97	Wright	Hancock, Anat. & Surg. Human Foot, p. 434.	..	....	....	.....	Scaphoid, 3 cuneiforms, 2 metatarsals.	R.	Uncertain	.....	Partial regeneration of bone believed to have occurred.
98	Billroth	Kappeler's Table.	M.	20	1860	Caries	Part of cuboid, 3d cuneiform, 5th metatarsal, part of 4th metatarsal.	R.	Very good	.....
99	Nichol	Monsau, Thèse de Strasbourg, 1863, 2d ser., No. 715.	M.	32	1862	Caries	Anterior half of cuboid, 2d and 3d cuneiforms, bases of 2d, 3d, 4th, and 5th metatarsals.	R.	Very good	.....	After nine months able to do farm work. Could walk from 12 to 15 miles without fatigue.
100	Saugor, E. F.	Med. and Surg. Hist. War Reb. Surg. Vol. Part 3, p. 623.	M.	Adult	1863	Gnashot wound	2d cuneiform, parts of 1st and 3d cuneiforms, base of 2d metatarsal.	R.	Good	.....
101	Kado	St. Petersb. Med. Zeit., 1864, 7, 183.	M.	Adult	1864	Gunshot injury	Cuboid, 2d and 3d cuneiforms, great part of 4th and 5th metatarsals.	R.	Good	.....	Walked after three months.
102	Kado	St. Petersb. Med. Zeit., 1864, 7, 183.	M.	Adult	1864	Necrosis	Scaphoid, 1st and 2d cuneiforms, greater part of 1st metatarsal.	D.	....	Pyemia	Lived six weeks.
103	Forster, C.	Guy's Hosp. Rep., ser. 3, vol. xvii. p. 387.	M.	4	1871	Caries	Scaphoid, internal cuneiform, part of 1st metatarsal.	R.	Good	.....	Left hospital after four months. "Gets about very well."
104	Kappeler	Op. cit.	F.	27	1871	Caries	Scaphoid, 3 cuneiforms, part of cuboid, and posterior third of 2d and 3d metatarsals.	R.	Very good	.....
105	Holmes, T.	Trans. Clin. Soc. 5, 207.	M.	Middle age	1872	Caries	Entire tarso-metatarsal articulation and 2d metatarsal.	R.	Good	.....	Two operations.
106	Nesbitt	Brit. Med. Journ., Dec. 14, 1878.	F.	8	1878	Caries	Cuboid, 2d and 3d cuneiforms, 2d and 4th metatarsals, and later 3d metatarsal.	R.	Very good	.....	Healed in 4½ months.

The three questions to be considered are :—

1. Is excision a safe operation, or at least attended with no greater mortality than the alternative—amputation?
2. Is it likely to put an end to the disease, or is recurrence of the morbid process in the unremoved bones of the foot to be expected?
3. Will the patient, after recovery from the operation, be left with a serviceable limb?

Of the 108 cases collected, 11 died (10.18 pr. ct.), but 1 of them died of amyloid disease in ten days, and 1 of phthisis in a month, and, if we deduct these cases, in neither of which was the fatal result due to the operation, the mortality is reduced to 8.33 pr. ct.; and if Tiling's case is thrown out, in which, after gunshot injury, intermediary excision was made, followed by amputation five days later, and by death from gangrene in another five days, the percentage is reduced to 7.4.

Of the 9 fatal cases (including Tiling's) in 4, at the lowest, a Syme amputation and in 5 a Chopart would have had to be performed; or, to put it in other words, out of 63 cases, in which the alternative was an ankle-joint amputation, 4 died (6.35 pr. ct.); and out of 45, in which a middle tarsal removal might have been made (though without doubt in some of them a Syme or Pirogoff amputation would have been performed), 5 died (11.11 pr. ct.).

The Syme operation mortality for caries is about 6 to 8 pr. ct. (at least 10 pr. ct. according to Delorme), the Pirogoff probably about the same, and the Chopart perhaps 4 pr. ct., though Schede has placed it as high as 10 pr. ct.

Examination of the table further shows, that while it is true that excision is attended with very much less mortality in young subjects, the opinion expressed by certain writers that it should be confined to them, is not warranted by the facts.

Of 87 cases, the ages of which are given, 28 were not over 15 years of age, of whom but 1 died (3.57 pr. ct.), 18 were between 15 and 25 years old, of whom 2 died (11.11 pr. ct.), and 41 were older, of whom 8 died (19.51 pr. ct.).

Of those in whom either the entire tarsus or at least the whole of one of its great divisions was taken away, the death-rate was, under 15 years of age, 6.67 pr. ct., over 15 and under 25, 10 pr. ct., and over 25, 27.27 pr. ct.

Of the 6 operations for gunshot injury the subjects of which were all adults, 1 (Tiling's) resulted in death (16.67 pr. ct.). In 4 of these 6 cases (in which is included the fatal one), an ankle-joint amputation would otherwise, without doubt, have been performed; an operation that for gunshot wound in our late war had a mortality rate of 25.1 pr. ct.

As respects the preservation of life then, excision of the whole tarsus, or of one of its great divisions, is not much, if any, more dangerous than

an ankle-joint amputation, and not very much more so than a middle tarsal operation.

It has, moreover, the advantage of permitting, if necessary, of the subsequent removal of the foot, which, in the cases tabulated, was performed seven times with but a single resulting death. That the disease is very unlikely to reappear is shown by the fact, that in only 3 cases (Champion's, Robert's, and Moreau's) did such recurrence take place. This fact, however, is not so strange as it may at first seem, as it is in direct accordance with the recognized law that the more thorough the removal of diseased bone the less will be the likelihood of a relighting up of the bone inflammation.

By far the most important question of the three proposed is that which has reference to the functional value of the saved foot. Is its usefulness likely to be sufficiently great to warrant the taking of a somewhat increased risk of life, and in subjecting the patient to the necessarily much greater duration of the period of healing—a period that, though it may be as short as four weeks (Wakley's), may occupy more than twice as many months (Socin's), or even half as many years?

In 13 of the 97 cases that did not die, the reports, either because imperfect or made soon after the performance of the operation, do not clearly indicate the end-result. In 10 the operations were failures, subsequent amputation being required in 7 of them; in 1 of these 7, however (Homan's), the healing is stated to have been progressing favourably, the foot having been removed at the patient's request; and in another (Watson's), made out of regard to "the patient's sensitiveness and weakness," the operator was "chagrined to find that there was no condition which should not have admitted of sound cicatrization."

In 6 cases I have considered the result as *fair*, five of the individuals being able to walk about, but requiring the aid of a cane, and in the sixth there was considerable motion at the ankle-joint, and the toes were freely movable, though the woman, two years and a half after the operation, continued to use a crutch in walking.

Forty-five times the ultimate functional value of the foot was *very good*, and twenty-three times more, *good*; and no small part of the twenty-three *good* results might very properly, I think, have been included with the *very good*.

Put in figures, we may say that, of the 108 operations, 10.18 pr. et. resulted fatally (more justly, as has already been stated, 8.33 pr. et.). Of the 95 cases, the end-results of which are known, 10.53 pr. et. were failures; 6.32 pr. et. left the subjects of them able to walk with a cane or crutch; in 24.21 pr. et. there was, after complete consolidation had taken place, no pain nor tenderness, little or no limp, and the individuals were not prevented by the condition of the foot from earning a livelihood; and in 47.37 pr. et. the result was so good that the gait was not a bad one,

the support of the body was firm, and locomotion was so easy and perfect that the individuals could, without special fatigue, walk long distances; even six leagues a day, if we may believe the report of de Housse's case, certainly, twelve to fifteen miles a day, as Michel's patient ultimately did.

As respects shape, though it must be changed, ordinarily materially so, the foot being shortened, broadened, and flattened, still no form of talipes need be developed if due care be taken to maintain a proper position during the period of healing, especially the later part of it.

Surely there was not in any of these sixty-eight cases that "weak, flabby, and deformed condition" of the foot that Roser would have us believe is to be expected, even when rapid healing occurs; and there was not one of the individuals that did not have "a firm weight-supporting foot, the serviceableness of which would compare with that of an artificial foot after a leg amputation." One of Humphry's cases ran about as though nothing had happened. One of Kappeler's patients, from whom he had three years previously removed the entire tarsus with the exception of the posterior part of the os calcis, was able to do full work in a stocking factory, walk over four miles, in a common shoe, without being tired, and as rapidly as others, and even dance, though not waltz.

Durand's patient later served thirteen years as a soldier. Beek's was able to do mountain climbing, and Langenbeek's walked for hours without limping. Each of my own patients whose cases I have reported in this paper earns his daily bread by his daily work, the one as a wagon driver, the other as a baker.

In the case which I reported eight years ago in *THE AMERICAN JOURNAL OF THE MEDICAL SCIENCES*, the man walked about the city without any difficulty; and if he did not perform regular work, it was because of his natural disinclination to do any more than he could help, and not because of the condition of his foot.

The ankle motions, even in certain of the complete or almost complete exeisions, were to some extent preserved. In Walter's case there was said to be "perfect usefulness of the joint;" and one of my own patients declares that he does not perceive any difference in the movements of the two ankles. Kappeler reports that in two of his cases the arch of the foot was preserved, though in a modified form.

In none of the cases was the shortening of the limb so great that it could not be corrected by a thickened sole; being in two of the eight cases in which the amount has been noted one-half inch, in one three-quarters of an inch, in one one inch, in three one-and-a-half inch, and in one two-and-a-half inches.

Osseous regeneration to greater or less extent was believed to have taken place in eight cases (3, 26, 43, 60, 64, 91, 98, 108).

Examination of the appended table confirms me in the opinion I had already formed from the cases that had fallen under my own observation, that the more extensive the removal of bone, the better the ultimate re-

sult. Münch has expressed himself to the same effect; and Kappeler has very properly declared that the larger the excision the more it resembles amputation, as respects the healing.

The very favourable result following many of the most extensive operations, makes me ready to believe the correctness of the report of Bilguer's case (which I have not included in the table) of removal, after gunshot injury, of "nearly all the bones of the foot," in which ultimately the "officer was enabled to walk and to resume his duties by means of a heel of double the usual thickness;" the truth of which Velpeau was evidently somewhat inclined to doubt.

As respects the method of operating in these tarsal excisions, no definite rules can be laid down. Ordinarily, a lateral incision or one on each side, while rendering the removal of the bones more difficult, will give ultimately the best result, a dorsal cut necessarily dividing the extensor tendons.

It is, however, very probable, that if the ends of such tendons be at once united by sutures, most, if not all, of the disadvantages of such section will be prevented; and even if left to make their attachments as best they may to the soft parts, a very excellent end-result may follow, as in my own case of removal of the tarsus and metatarsus.

Theoretically, the excision when for caries or necrosis should be made sub-periosteally, but, practically, it is very doubtful if the preservation of the periosteum will, in the majority of cases, be of any advantage to the patient; as much, if not all, of such retained membrane will usually be destroyed in the after long-continued suppuration of the wound. Very great advantage attends the use of the Esmarch bandage; and quite firm fixation of the foot and leg must be made.

Immobilization by the application of a plaster-of-Paris dressing, in the single case in which I made it, did not seem to answer as good a purpose as the use of the fracture box, or the tin or wire splint.

In determining in any given case whether or not excision should be performed, the chief, if not the only thing to be taken into consideration, is the probable ability of the patient to endure the protracted period of healing.

Very early or quite advanced age is not a positive contra-indication; Cooper Forster's patient was but four years old; Gant's was sixty; both recovered with useful feet.

In very unhealthy and much debilitated subjects, amputation will generally be preferable to excision; as also in cases of extensive crushing of the foot.

Under other circumstances, as respects the cause of the existing disability and the general condition of the patient, I cannot but feel that enough has already been done by English, Continental, and American surgeons to show that the generally received opinion that extensive tarsal disease necessitates amputation is an incorrect one, or at least one that requires and should have reconsideration.

ARTICLE IV.

ON THE RENAL CIRCULATION DURING FEVER. An Experimental Research made at the Pathological Institute of the University of Leipzig. To which was awarded the Cartwright Prize Essay for 1883.¹ By WALTER MENDELSON, M.D., of New York.

THE object of this research was to determine by experimental methods the actual condition of the circulation in the kidney during fever.

Hitherto no such experiments have, to our knowledge, been made. Renal pathology has had to content itself with hypotheses founded on the general condition of the circulation as it could be observed in more accessible parts of the body, and on the changes occurring in the urine.

It is perhaps natural that from these insufficient methods wrong conclusions have been drawn. Our work, founded on direct experimentation, has shown the opinion, hitherto prevalent, that the kidney during fever is in a state of congestion, to be wrong. Instead of being swollen, from its vessels being distended with blood, it is, on the contrary, small and shrunken, and in a state of extreme anæmia.

We present in this paper the details of the experiments by which we arrived at the above results, as well as further conclusions derived therefrom.

The work was done during the months of May, June, and July, 1882, in the Physiological Institute of the University of Leipzig, where we have acted under the advice and kind auspices of Professor Cohnheim, who suggested to us the subject and gave us his counsel as to its details. We take the opportunity presented to us here, to express to him our thanks and appreciation for all the facilities so freely offered in carrying on this research.

We employed for our investigations the instrument invented by Roy and used by him in studying the functions of the spleen,² and by him and Cohnheim together in studying the kidney.³ This instrument, called the Oncometer or "bulk-measurer" (for description see pages 386, 387, and 388, Figs. 1 and 2), can be applied to the kidney without, as has been shown by its inventor, interfering with the functions of the organ, and it affords at all times an exact index to the condition of its circulation.

Having had thus placed at our disposal a means by which the *circulation*

¹ The Cartwright Prize of \$500, open to universal competition, is given every other year for the best original research presented to a committee appointed by the Alumni Association of the College of Physicians and Surgeons of New York.

² C. S. Roy, The Physiology and Pathology of the Spleen. Journ. of Physiol., vol. iii.

³ Same. On the Mechanism of the Renal Secretion. Proc. of the Cambridge Philos. Soc., May 23, 1881. Cohnheim and Roy, Untersuchungen über die Circulation in den Nieren. Virchow's Archiv, Bd. lxxi. p. 424 (1883).

could be satisfactorily studied, it next remained to hit upon a method of producing the fever in the dogs to be used, while they were in that state of complete immobility during the time the oncometer was in use, which is absolutely necessary for success.

As a full comprehension of all the methods used is desirable, in order to fairly judge the results obtained, they will be detailed at length.

Methods of producing Fever.—The ordinary means of artificially producing fever in animals has been to inject into a vein or under the skin, pus, or infusions of various organic matters, as hay,¹ for instance. Lately, von Bergmann and Angerer² have found that the injection of solutions of pepsin, and of fresh gastric juice into the blood causes a marked rise of temperature, and although we cannot, from want of sufficient proof being adduced, agree with the explanation given by the authors, still the fact we have a number of times confirmed.

The fever produced by these various means has always been in animals not under the influence of drugs which paralyze the motor or sensory functions. We found that when these functions were profoundly affected the expected febrile rise of temperature did not ensue, as was illustrated by the following experiments:—³

¹ Billroth, Langenbeck's Archiv, vol. ii. vi. xiii. C. J. Weber, Berlin. klin. Wochens. 1864.

² E. v. Bergmann and J. Angerer. Das Verhältniss der Fermentintoxicationen zur Septicæmie. Festschrift zur Feier des 300-jährigen Bestehens der Universität zu Würzburg, 1882. These authors hold that the injected pepsin, gastric juice, etc., have the power of dissolving the white blood globules, which leads to a coagulation of the blood, and that all the symptoms, as vomiting, diarrhœa, dyspnœa, etc., are due to capillary thrombosis of the organs in which these symptoms originate. It is not quite clear to us whether they regard the fever as due to a prevention of radiation from the skin on account of the cutaneous capillaries being occluded, but it would almost seem to follow from their statements. Of the actual occurrence of this general capillary thrombosis there are no conclusive proofs, and to our mind it seems much more likely that the symptoms are of nervous origin; the digestive ferments injected into the blood producing a disturbance of the central nervous system.

³ Since writing the above, N. Zuntz has published a short article entitled "Zur Theorie des Fiebers" in the *Centralblatt f. d. med. Wissenschaften*, No. 32, August 12, 1882, in which he describes obtaining results in curarized dogs, identical to ours. Zuntz concludes, rather hastily it seems to us, that the febrile process in general is due to increased oxidation caused by the irritation of the nerves by pyrogenous agents, and as the muscles are the chief seat of tissue metamorphosis, consequently—he argues—when the terminal nerve-plates are paralyzed by curara, the oxidizing powers of the muscular tissue become paralyzed also, and no fever ensues.

This assumption, however, does not tally with our cases where there was absence of fever in animals under the influence of *morphine*, where the nervous supply of the muscles was in nowise affected. Much more investigation, and especially calorimetrical determinations like those of Senator, Wood, etc., are necessary before such a complex question, involving so many different factors, can be definitely decided.

Our own opinion is that the absence of fever is due to some central nervous cause, but whether inhibitory or irritative in nature we would not venture to say.

Experiment No. 2.—Injection of pus after morphine. May 12th, 1882. Dog. Weight 6500 grams. 10.40 A. M. Temp. 39.3° C. in rectum.

Time.	Temp.	Remarks.
10.40 A. M.	39.3° C.	Injected 0.06 morphine hypod.
10.45	.....	Vomited and defecated. Beginning to grow quiet.
10.50	.....	Losing power in legs; sinks to floor.
11	38.4	Injected beneath skin of left thigh 25 c. e. fresh pus, free of all odour, and containing very few bacteria.
11.15	37.5	Asleep, but easily awakened by any sudden noise. Covered up.
11.55	36.4	Lying on side; quiet, but not asleep.
12.30 P. M.	36.3	
2	36.4	
2.45	36.8	Running about in an uneasy, aimless sort of way.
3.45	37.2	
7.45	39.4	
May 13th.		
9.30 A. M.	40.8	Listless and dejected. No appetite.
11.15	40.6	

In this experiment but 0.06 of morphine were injected; an amount barely sufficient to put the dog asleep for any length of time, let alone to produce a deep narcosis, yet the temperature sank from 39.3° to 36.3° in a little less than two hours, in spite of the fact that a quantity of pus had in the mean time been injected,—pus which in another dog, not morphinized, caused a rise of temperature from 36.3° to 39.9° in forty-five minutes. Nor till nearly nine hours after the purulent injection, and when the effects of the morphine may be fairly assumed to have passed away, had the temperature risen to its original value. The next morning the dog was dejected, ate nothing, and in fact presented all the outward symptoms of having fever. The temperature was 40.5° , and remained at about that height during the day, showing that the lack of fever in the beginning was not due to the pus having lost its fever-producing properties, but to the action of the morphine upon the system.

Experiment No. 12.—In a healthy dog weighing 5420 grams, and having a temperature of 39.2° C. at 10.30 A. M., 20 c. e. of hay infusion were injected into a vein. The infusion was two days old, had no putrid odour, but contained a large number of bacilli. At 1 P. M. the temperature had risen to 40.6° C. when 14 c. e. of the same infusion were injected hypodermatically, and the animal placed in a warm-air chamber, having a temperature of about 20° C. This last precaution was taken to prevent excessive radiation, the day being somewhat cool. In the meanwhile the dog had become much dejected, vomited frequently, or made attempts to do so, and had had several movements from the bowels. At 2.5 P. M., three hours and thirty-five minutes after the first injection, the temperature was 41.5° C., a rise of 2.3° C., proving conclusively the power of this infusion to cause fever. The dog afterward recovered fully.

Experiment No. 13.—Injection of hay-infusion after (morphine and) curara. June 15th, 1882. Bitch. Weight 4970 grams.

Time.	Temp.	Remarks.
9.50 A. M.	39.4° C.	Before any operative interference.
10	.....	Injected hypod. 0.02 morph, and after exposing left kidney for the oncometer, and performing other necessary operations, injected into vein 3 c. e. of a $\frac{1}{2}$ per cent. sol. of curara (which had to be followed at intervals by more).

Time.	Temp.	Remarks.
11.30 A. M.	.....	Put in warm box (temp. about 30° C.), and injected into vein 25 c. c. of same hay-infusion that was used in the experiment just detailed.
11.40	34.4° C.	
12.10 P. M.	34.2	
12.30	34.2	
12.55	34.4	
1.25	34.6	
1.45	34.7	

A small quantity of morphine was given in the beginning to sufficiently dull the pain of the operation, and the curara administered immediately before the oncometer was applied to the kidney. During the hour and a half used in performing the necessary operations (which aside from the larger one of exposing the kidney, included the minor ones of laying bare the carotid and inserting a canula for connection with the manometer, besides preparing a vein for the injection of curara and hay-infusion), the temperature fell five degrees, part of which was due to the depressing effects of the morphine and curara, and part to the operation itself. However, in spite of putting the animal in the most favourable condition to prevent loss of heat by radiation, the temperature, after injecting the hay infusion, rose but three-tenths of a degree in two hours.

Experiment No. 19.—Injection of pepsin. June 24th, 1882. Dog. Weight 6000 grams (same dog that was used in Exp. 12, now perfectly recovered).

Time.	Temp.	Remarks.
10.55 A. M.	39.7° C.	
11	.....	Injected into vein 5 grms. pepsin in 50 c. c. water. (Pepsin did not dissolve completely.)
11.45	40.9	Trembling violently (chill); much dejected.
12.20 P. M.	40.8	
1	41.4	
1.30	42.2	Condition unchanged, but trembling ceased.
6	39	Evidently feels better. Vomited a good deal during afternoon.

This rapid rise of temperature coincides with the results obtained by von Bergmann and Angerer.

Experiment No. 22.—Injection of pepsin after chloral. June 28th, 1882. Dog. Weight 4000 grams.

Time.	Temp.	Remarks.
10.45 A. M.	.....¹	Injected about 5 grams of chloral in solution into stomach.
11.15	36.6° C.	Dog very drowsy, but not completely narcotized. Injected about 3 grms. pepsin in 50 c. c. water (filtered solution) into vein, and put dog in a warm box at a temperature of 25°.
11.30	35.5	
12	35.2	
2 P. M.	.....	Dog so far recovered as to be able to walk about.
4.30	40.2	Tremors; much dejection.
6.15	39.9	

June 29th.

10 A. M.	39.9	Dog eats little, and is dejected. (Subsequently recovered entirely, and was used for another experiment.)
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¹ By an oversight the temperature of the dog before giving the chloral was not taken.

This experiment, like those performed with morphine and curara, shows that after giving the chloral, a primary fall of temperature took place, which lasted as long as the effects of the drug were present. Not till the power of the chloral had sensibly diminished did the pyrogenous agent begin to assert its presence in the organism, by causing a rise of temperature.

The results of the experiments made to produce fever in narcotized animals (and more than are here enumerated were performed, and all with a like result) may therefore be summed up as follows :—

In dogs in which complete motor or sensory paralysis (or both) have been produced by morphine, chloral, or curara, there is a rapid and considerable fall of the bodily temperature, even when radiation is to a great degree prevented by inclosing the animals in a warm-air box. Injections into the blood of pyrogenous agents, such as pus, hay-infusion, and pepsin, fail to cause a rise of temperature as long as the system is under the effects of the drugs used.

Morphine, chloral, and curara were the only agents employed, but it is likely that other similar drugs would act in the same way.

Having thus been defeated in our attempts to cause fever in dogs by all the ordinary means, under the conditions necessary for the experiment, a number of trials were made with the oncometer in curarized dogs in which an artificial rise of temperature was produced by keeping them inclosed in a warm-air chamber. In this way, it is almost needless to say, very high temperatures (up to 45.5° C.), could without difficulty be maintained. The results of these experiments will be given further on.

The warm-air chamber consisted simply of a galvanized sheet-iron box with double sides and bottom, the space between being filled with water kept hot by Bunsen burners placed beneath. In the walls of the box were suitable openings for the insertion of thermometers. For a cover, a double layer of thick felting was found to be the most convenient.

However interesting and instructive the results were obtained with the artificial *thermic* fever (if we adopt the nomenclature of H. C. Wood¹), still it might well be objected that as thermic fever is not yet universally acknowledged to be identical in its nature with infectious and other fevers, so the deductions drawn from experiments on the former would not hold good when applied to the latter. Some other method, therefore, had to be contrived in which the source of the fever should be internal and not external, and in which the dog should still be insensitive enough to allow of a successful application of the oncometer.

Wood,² in his experiments on fever, found that lesions of the brain above the vaso-motor centre in the medulla, produced no change in the arterial blood pressure. The thalami optici are supposed to contain the sensory

¹ H. C. Wood: *Thermic Fever or Sunstroke*, Philada. 1872.

² Same. *Fever, a Study in Morbid and Normal Physiology*. Smithsonian Contributions to Knowledge, No. 357, Washington, 1880.

tracts; consequently, we thought, destruction of these centres might render the animal operated on insensible to pain, while its power of reacting to pyrogenous agents would remain unimpaired.

On consulting Professor C. Ludwig on the feasibility of this plan, he informed us that he had for some time used this method himself for producing immobility in animals in which he was studying the functions of the various cardiac nerves, and had found that no change, either in the blood-pressure or the heart's action, occurred after this lesion of the brain. His mode of operating consists in trephining the skull about five mm. on either side of the median line, so as to avoid the longitudinal sinus, and at the point of the greatest cranial convexity, which lies four to five centimeters in front of the prominent occipital tubercle. After making a small slit in the dura mater a blunt glass rod of about two mm. in diameter is gently pushed down, directly vertically, toward the base of the skull, till it strikes the bone. The operation, as far as the brain is concerned, is almost bloodless, and it will be found that in nearly every case the thalamus has been punctured.

Dogs so operated on are, for all the purposes of the experiment, immobile and insensitive enough to allow of the perfect application of the oenometer, and furthermore, it was found that injections of pyrogenous agents caused the desired rise of temperature. As hitherto our promptest results had been obtained from injections of pepsin; this agent was used in these experiments.

The following experiment is detailed here; for others, see Experiments Nos. 24 (p. 403) and 25 (p. 393).

Experiment No. 23.—Injection of pepsin after puncture of right thalamus. June 28th, 1882. Bitch. Weight 3300 grams.

Time.	Temp.	Remarks.
12.30 P. M.	39.8° C.	Before any operation.
1.10	.....	Punctured right thalamus. ¹ Dog's body turned to left, and has "circus movements" in same direction. Anæsthesia apparently on both sides, and blindness. Sensorium much affected.
1.45	39	Injected a filtered solution of 2 grms. pepsin in 40 c. c. of a 0.6 per cent. solution of NaCl.
2	38.8	Pnt in warm-air box, temperature about 25°.
3.15	39.7	Lying quietly.
4.30	40.4	
5.45	40.3	
6.10	40.3	Removed from box. Condition much the same as in the beginning. Drinks water when offered it, and notices when called. Head wound dressed with iodoform.

June 29th. 10.30 A. M. T. 39.8° C. Circus movements not so marked, though body, when dog stands quietly, is turned to left. Soon sinks on right side

¹ It was found that the puncture of one thalamus was sufficient for practical purposes, and that the temperature rose more rapidly and higher than when both thalami were destroyed.

when left alone. Licks itself, and notices when called. Growls and tries to bite when handled. No appetite.

July 3d. Dog eats well. Circus movements gone. Some anæsthesia on both sides, more on right. Wound in scalp healing well.

Unfortunately, no *post-mortem* examination of the brain was subsequently possible, as the dog escaped from the yard in which it was confined, and was seen no more. It may, however, be safely assumed that the thalamus was punctured in this instance, for in the eight other times, in which this operation was performed, *post-mortem* examination showed that the thalamus had always been reached.

Having thus determined upon a method of producing fever in dogs which would satisfy the conditions of the research, it next remained to investigate, by means of the oncometer, the effects of this fever on the circulation of the kidneys.

*Description of Apparatus.*¹—The oncometer of Roy² is an ingenious application to organs *in situ* of the plethysmograph of Mosso.³ The principle of its action, like that of the latter instrument, depends on the expansion of the organ under investigation (due to an increased amount of blood entering it), displacing a quantity of some surrounding liquid, as oil, equal in amount to the increase in volume the organ has undergone. By means of suitable mechanical appliances these variations in bulk, transmitted to the surrounding liquid, are registered graphically upon the revolving drum of Ludwig's kymograph.

The Oncometer.—The oncometer, as constructed for the kidney, consists of an ovoid box of sheet-copper, and is composed of two symmetrical halves joined by a hinge, A (Fig. 2). Each half is made up of two shells, B B', the inner fitting accurately into the outer. By means of the nut, C, which plays upon the tubular screw, D, soldered into an opening at the point of greatest convexity of the inner shell, and projecting through a corresponding opening in the outer shell, the two may be drawn closely into apposition with each other. Into the tubular screw, D, fits the double canula, E, composed of a larger and a smaller tube, as shown in the figure.

At the large canula, F, connection is made with the writing-apparatus, to be described later, whilst the smaller, G, serves to allow any air-bubbles to escape that may have remained after the instrument has been filled with oil. At a point on each half of the box opposite to the hinge there is a semicircular piece cut out of each edge, which makes a round opening, H, when the box is closed. This opening is provided with a brass collar, K, holding the eccentric catch, L, which keeps the instrument shut when in use. Through this opening the vessels, nerves, and ureter of the kidney pass, as is shown diagrammatically in Fig. 2 (where X represents the kidney, and X

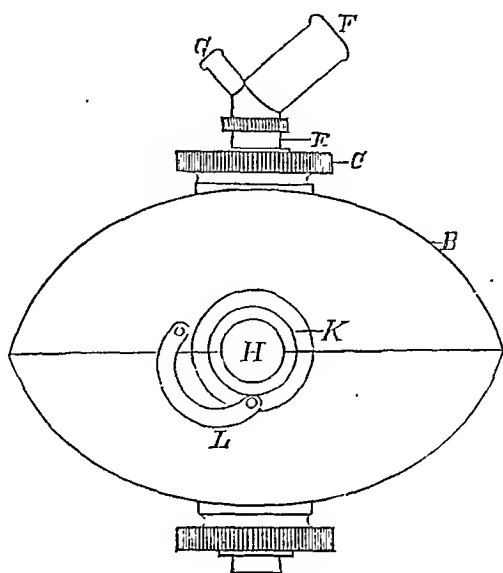
¹ This apparatus may be procured of Mr. Max Schanze, Machinist to the Pathological Institute of Leipzig.

² C. S. Roy, *The Physiology and Pathology of the Spleen*, Jour. of Physiology, vol. iii. No. 3.

³ A. Mosso, *Von einigen neuen Eigenschaften der Gefässwand*, Ludwig's Arbeiten, 1874.

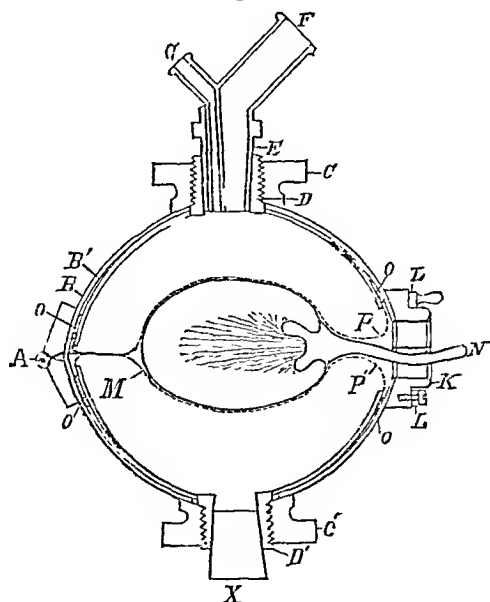
the vessels, nerves, and ureter), the thick, rounded edge of the brass collar, κ , preventing their being sharply bent or injured in any way.

Fig. 1.



When the oncometer is to be used, both the inner shells are removed by unscrewing the nuts, $c\ c'$. Around the rim of each, half a centimeter

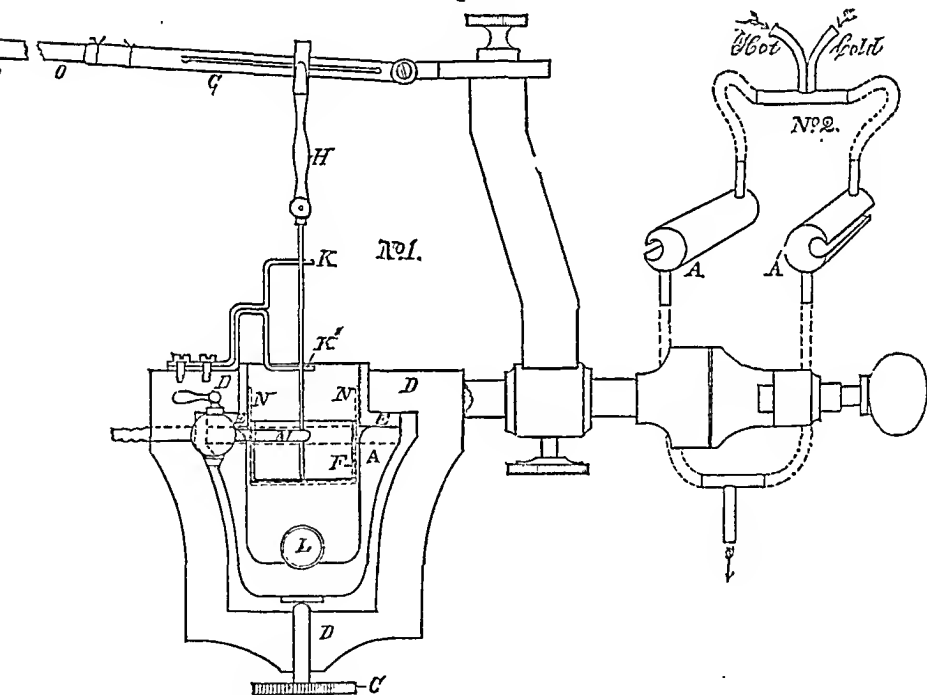
Fig. 2.



from the edge, a flat rubber band (shown in section at $o\ o$, Fig. 2), upon which caoutchouc varnish is smeared, is stretched to serve as a washer.

Over the concavity of each of the inner shells a piece of moistened calf's peritoneum¹ is loosely laid, the edges turned over, and pressed against the varnish on the washers, and the inner shells are then replaced and brought firmly against the outer ones by the nuts c c' . Each half of the oncometer consists now of a separate chamber, bounded on the outside by the copper shells, and on the inside by the membrane, p p' (dotted line). These chambers are next filled full with olive oil, to the exclusion of all air. A quantity of oil, a little less in amount than it is calculated the kidney will occupy, is then pressed out by raising the membranes with the fingers from beneath, whilst the box is so held that the opening for the canulas is highest. This manœuvre is repeated for each half in turn. One opening is closed with a well-fitting cork, x , whilst into the other, the double canula, having rubber tubes on each of its arms, is inserted. The canula and tubes are then emptied of the air they contain by pressing the oil up into them, and are kept closed by spring clamps placed upon the tubes.

Fig. 3.



The Oncograph.—The writing apparatus for recording graphically the changes in the bulk of the kidney (or other organs) has been called by Roy the oncograph. (Fig. 3.)

¹ After numerous experiments with other membranes, Roy found this one to answer all conditions, it being thin, flexible, impervious to, and unaffected by oil. See *Journal of Physiology*, vol. i. p. 454; vol. ii. p. 325; vol. iii. p. 205, etc.

Briefly, it consists of a cylinder, A, which by means of the screw, C, may be firmly held against the flat, annular flange, E, of the frame, D. Within the cylinder is an exceedingly thin and light piston-head, F, made of hard rubber, which is connected above with the lever, G, by the jointed piston-rod, H, passing through the guides, K K'. The lower joint of the piston-rod consists of a delicate steel wire, whilst the upper and the lever, G, are of aluminium, in order that their weight shall offer the least resistance to slight impulses received by the piston-head. Between the cylinder, A, which receives the oil, and the flange, E, is clamped a piece of the same membrane used before (shown by the dotted line, X), which prevents the escape of the oil from between the cylinder and the piston. Through the brass tube, L, the oil within the cylinder is connected with that in the oneometer by means of short glass tubes, connected by bits of rubber tubing.

When the cylinder is to be filled, the piston is pressed down as far as the membrane will allow it to go, the cock of the tube, M, is opened, and oil is then allowed to enter from a height through the tube L, the air escaping through M. When the cylinder is entirely full, a clamp is put upon the rubber tube connected with L, and the piston pressed downwards until the lever stands at any desired angle, the surplus oil escaping through M, the cock of which is then shut. The lever is lengthened by tying to it a culm of straw pressed flat, and which has a small piece of aluminium, R, bent and pointed to act as a style, attached to its end by sealing-wax.

Preparation of the Animal.—The dog (animals weighing from five to seven kilos were commonly used), after having been rendered insensible or immovable by one of the means already described, was placed upon its right side, and, after shaving the skin of the left flank,¹ an incision extending from the lower border of the last rib nearly to the crest of the ilium was made. The muscles and fasciæ were then cut through, layer by layer—any large vessels that bled being ligated, and the larger nerves being cut—until the line of aponeurotic junction between the sacro-lumbalis and the oblique and transverse abdominal muscles was reached. This was then so incised as to cut the peritoneum as little as possible, and the kidney, enveloped in its fat, drawn carefully out through the wound, and its capsule dissected away. All the small vessels that enter the cortex from the capsule were either tied with fine thread close to the organ, or closed by torsion. The large renal vessels and ureter at the hilus were only so far separated from the loose fat and connective tissue that envelop them as was necessary to allow their free passage into the oneometer. Especial care was taken not to wound the fine plexuses of nerves and lymphatics that surround the renal bloodvessels on all sides.

The kidney having been prepared, the dog was removed to the warm-

¹ As the left kidney lies somewhat lower than the right, it is more accessible.

air box and the oncometer, previously warmed by being placed in hot water, applied. Great care was taken not to allow any air to enter the oil chambers, as the presence of even a small quantity, by its rapid expansion with the rise of temperature in the dog, may cause considerable errors in the interpretation of the traces. To avoid therefore the entrance of air, the following method was, after trial of others, found satisfactory.

The oncometer was filled pretty full of oil in the beginning, as described on page 388, and closed over the kidney. The two halves being then gently pressed together, and the larger tube of the canula being open, the superfluous oil flowed out. As soon as enough had escaped to allow the edges of the two halves to come together, the catch was snapped and a clamp applied to the tube, which was then connected with the writing apparatus, whose tube and the tube of the canula were filled to the top with oil from a pipette before being joined. In this way a continuous connection between the body of oil in the oncometer and that in the oncograph was effected. By raising or lowering the dog the two instruments were next brought on the same level, in order that the column of oil should exert no pressure, either positive or negative, upon the kidney.

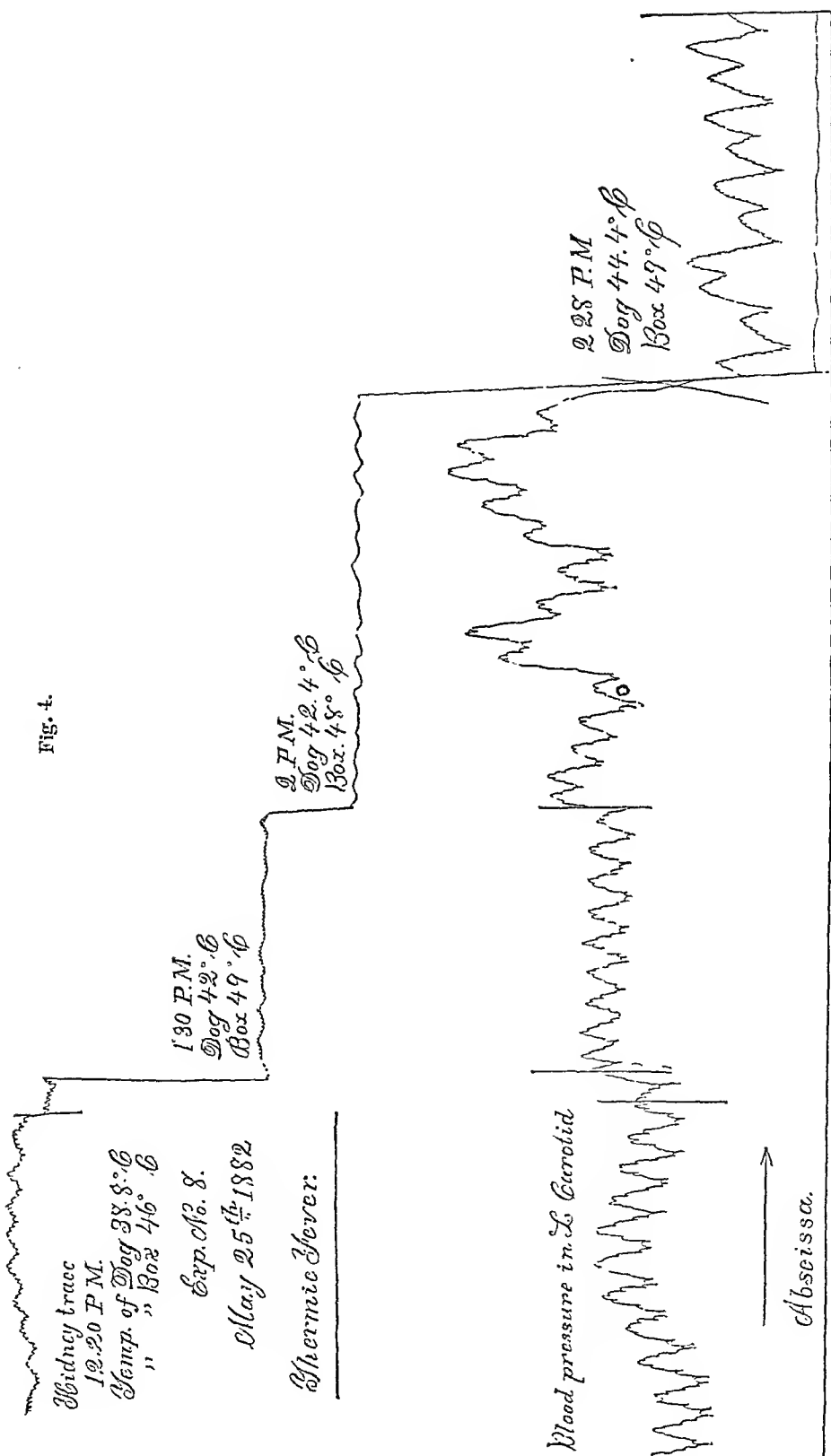
As tracings of the general arterial pressure were always taken along with those of the kidney, the left carotid was connected with the registering manometer, the style of the latter being so arranged as to be as nearly perpendicular as possible beneath that of the oncograph.

Of the two curves thus traced upon the blackened paper of the kymograph, the upper corresponded to the variations occurring in the bulk of the kidney, and the lower to those in the arterial pressure as measured in the carotid.

On inspecting Fig. 4, it will be seen that the kidney trace consists of a series of waves, each wave being made up of a number of wavelets. The former correspond to the respiratory waves of the pulse, while the latter are the pulse-waves themselves. The accuracy with which these are traced forms a good index to the sensitiveness of the apparatus.

As each experiment always extended over a number of hours, it was, of course, out of the question, and, indeed, unnecessary to take a continuous tracing of the whole duration, but instead, short tracings were made, generally at intervals of from five to fifteen minutes. The temperature of the dog, taken in the rectum or vagina, was noted on the blackened paper at the beginning of each of the sections of which the whole tracing was finally composed. In this way a very graphic impression of the results of the experiment was obtained on a space of paper readily overlooked at once.

It will be observed, on examining Fig. 4, of Experiment No. 8, detailed below, that the kidney tracing constantly approaches nearer and nearer to the abscissa, whilst the mean arterial pressure gradually rises, only to



fall again when the temperature reaches a point at which life becomes impossible.¹ With each rise in the bodily temperature, there is a corresponding fall in the kidney trace, until at last the pulsations of the kidney become so small that the oncograph fails to register them, and the trace, instead of being made up of a number of curves, now changes to a straight line. The pulse waves disappear first, being the smallest, and these are followed by the respiratory.

The calculation of the amount of diminution in volume which the kidney undergoes was made as follows:—

At the beginning of the experiment (or at its close, it makes no difference which), the oncograph was disconnected from the oncometer, and its tube connected with a graduated burette filled with some of the same oil used for the other apparatus. Oil from the burette was then allowed to slowly flow into the oncograph, one cubic centimetre at a time. As the oil entered, the lever G (Fig. 3) of course rose, its style, r, making an upright trace upon the blackened paper. After the injection of each cubic centimeter the drum of the kymograph was allowed to revolve for a couple of seconds, which caused a horizontal mark, about a couple of millimeters long, to be made at right angles to the former trace.

Thus, a scale was made, the number of whose divisions corresponded to the number of cubic centimeters of oil that had entered the writing apparatus. Each division of this scale was then measured, and was found in this case to be 13 mm.² The difference between the height of the lever, as measured from the abscissa, at the beginning and at the end of the experiment, expressed in cubic centimeters of oil, would therefore give the loss in bulk maintained by the kidney during the course of the experiment. The diminution of the kidney's bulk, however, is due to the diminished amount of blood that enters it; therefore, instead of reckoning cubic centimeters of oil, the weight of cubic centimeters of blood must be taken.

The specific gravity of dog's blood, as we determined it, was 1.061; consequently, it was only necessary to substitute this figure for each cubic centimeter of oil to obtain the loss in weight which the kidney had sustained.

The application of the oncometer, merely to determine the facts regarding changes occurring in the renal circulation during fever, was made in all ten times (seven with thermic, and three times with pepsin fever), and every time, without a single exception, it was shown that *during fever a progressive diminution in the volume of the kidney occurs.*

Two experiments are given here as examples of this:—

¹ This rise and subsequent fall of the arterial pressure correspond to the results obtained by Senator. See *Die Albuminurie im gesunden und kranken Zustande*, p. 45. Berlin, 1882.

² The length of the divisions of the scale will, of course, vary with the length of the lever.

Experiment No. 8 (Fig. 4).—Thermic fever. May 25th, 1882. Dog. Weight 5 kilos.

Time.	Temp. of dog.	Temp. of box.	Remarks.
19.30 A. M.	39.4° C.	.....	Before any operation. Then exposed left kidney, left carotid, and a vein. Curara, and artificial respiration 26 to the minute.
11.35	38.2	.....	Put in box.
11.55	38.2	45° C. ¹	
12 M.	38.3	46	
12.20 P. M.	38.8	46	
12.30	39.2	46	
12.55	40.2	47	
1.5	40.6	47	
1.20	41.4	49	Restless; received more curara.
1.30	42	49	Still somewhat restless.
1.40	42.2	48	
1.45	42.4	48	After about every 6th respiration there is a temporary increase of the blood pressure, with a corresponding temporary decrease in the volume of the kidney.
2	43	49	
2.20	44.2	48	
2.35	44.6	51	
2.45	45	52	
2.55	45.4	48	
3.10	.....	...	Dog dead. Renal vessels tied, and the organ removed and weighed; weight 24.55 grms.

Calculation.—Height of lever at beginning of experiment, mm. 126
 " " " " close " " mm. 2.5

Difference, mm. 123.5

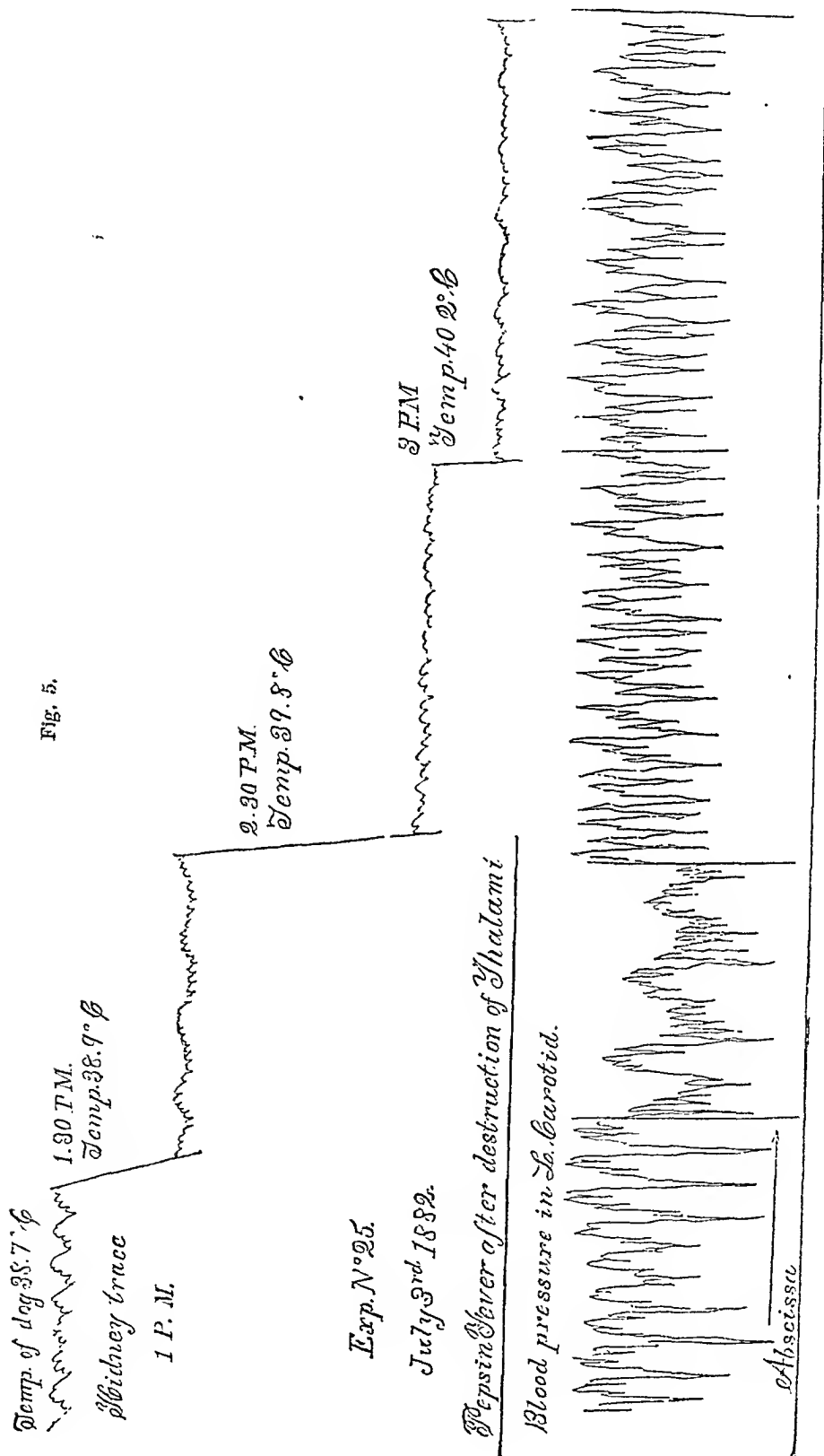
13 mm. on the scale = 1 c.c. oil = 1.061 grm. blood; therefore
 123.5 mm. " " " = 9.5 c.c. oil = 10.079 grm. blood; = what the
 kidney lost in weight during the experiment.
 24.55 + 10.079 = 34.629 grm. = original weight of kidney.
 Loss of weight = 29.08 per cent.

Experiment No. 25 (Fig. 5).—Pepsin fever after destruction of left thalamus. July 3d, 1882. Dog. Weight 6400 grams.

Time.	Temp. of dog.	Temp. of box.	Remarks.
9 A. M.	39.7° C.	.....	Before any operation. Punctured left thalamus, then exposed the kidney, and performed the other necessary operations.
11.45	38.6	.....	Placed in box, merely to prevent excessive radiation.
11.55	.....	.....	Injected into vein about 6 grms. pepsin in 100 c.c. water (filtered solution).
12.10 P. M.	38	35° C.	Considerable salivation.
12.20	38.2	35	
1.30	38.9	35	
1.55	39.3	...	
2.30	39.8	35	
3	40.2	30	
3.40	40.5	30	

¹ The temperature of the box in all these experiments cannot be taken as the absolute one to which the animals were exposed, as in many cases the cover was left on entirely, or very frequently removed for purposes of examination, and consequently free radiation must have occurred.

Fig. 5.



Time.	Temp. of dog.	Temp. of box.	Remarks.
4.50 P. M.	41.2° C.	28° C.	Dog restless; mouth dry; drinks water when given it. Respiration at times very jerky. Has spasms of extensor muscles of limbs and trunk.
5.40	41.9	28	
6.10	41.8	28	
6.15	41.6	...	
6.20	.....	...	Tied renal vessels, and removed kidney. Weight 21.2 grms. Dog killed.

Post-mortem Examination.—Left thalamus extensively destroyed. The lower half of the right thalamus has been punctured in a direction from the median line.

Calculation.—Height of lever at beginning of exp't (temp. 38.6°), mm. 155
 " " " " close " " (temp. 41.9), mm. 105

Difference, mm. 50

13 mm. on the scale = 1 c.c. of oil = 1.061 grms. of blood; therefore
 50 mm. " " " = 3.85 c.c. of oil = 4.08 grms. of blood = what the

kidney lost in weight during the experiment.

$4.08 + 21.2 = 25.28$ grms. = original weight of kidney.

Loss of weight = 16.14 per cent.

The following are the estimations of the loss of weight the kidney sustained in different experiments.

	No.	Thermic fever.	Pepsin fever.
Experiment	No. 7,	31.14 per cent.	.....
"	" 9,	20.33 "	.....
"	" 10,	32.49 "	.....
"	" 11,	23.12 "	.....
"	" 24,	.....	7.88 per cent.
"	" 25,	.....	16.14 "

As it could be supposed that this contraction of the renal vessels, causing the loss in bulk of the kidney, might take place in non-fevering dogs as well, merely from the irritation due to the presence of the oncometer, several experiments were made to settle this point. The oncometer was applied to the kidney and left on for several hours, the bodily temperature being normal. It was found, however, that the kidney retained its original volume throughout, but began to contract as soon as fever was afterward superinduced.

Determination of Cause.—The fact of the kidney's diminished volume having been thus definitely determined, it now remained to investigate the causes.

That changes in the volume of the kidney must depend on the amount of blood contained in its bloodvessels at any one time, becomes evident when we consider that the kidney is an organ which, outside of these vessels, contains no contractile elements.

Variations in the volume of blood caused by changes in the calibre of the renal capillaries may take place either from a central irritation, a peripheral irritation, or a combination of the two.

Peripheral Irritation.—Roy and Cohnheim have shown that when the nerves of the kidney are intact a contraction of the organ, consentaneous

with the rise of the general arterial pressure, occurs when a peripheral stimulus is applied to any part of the body. This reaction may be used as a test to determine whether the connections between the nervous centres and the kidney have been completely severed or not.

Section of the nerve trunks supplying the kidney is always a tedious operation, and at best an uncertain one, as the origin and course of the nerves are subject to considerable variation.¹ We found it better, instead of severing the main branches, to carefully tear away with a pair of delicate forceps, all the nerves that could be seen entering at the hilus, and as these surround the vessels in a close plexus, considerable care is requisite to clean them away thoroughly. The ureter was divided about an inch from the hilus, in order to cut off all nerves entering on it.

It was found in the majority of cases, that after this operation had been carefully done, the kidney no longer, or but slightly reacted to peripheral stimulation, showing conclusively that all, or by far the greater number of renal nerves must have been divided. As intra-renal ganglia have not to our knowledge been discovered, it was *a priori* to be supposed that after severance of the nervous connections no change would occur in the kidney during a rise of temperature. This supposition proved to be correct.

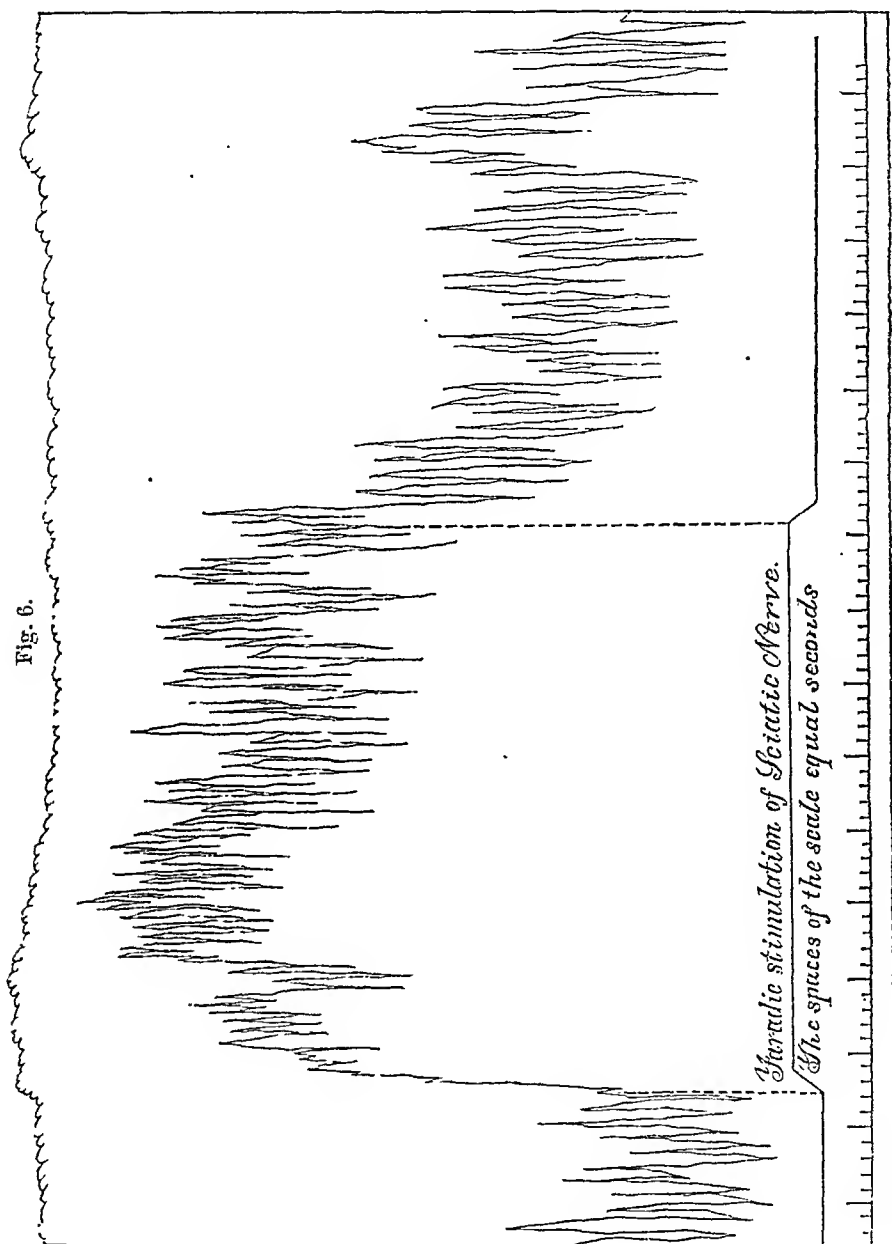
Experiment No. 33.—Kidney enervated. Thermic fever. July 20th, 1882. Dog. Weight 5400 grams.

Time.	Temp. of dog.	Temp. of box.	Remarks.
10.30 A. M.	39.5° C.	.....	Before operation. Gave morphine 0.04 hypo. and later eura. Artificial respiration. Kidney exposed and enervated of all visible nerves, and ureter cut.
12	36.9	.....	Faradic stimulation of sciatic causes rise in arterial pressure, but kidney remains almost unaffected.
12.45 P. M.	38	45	
1	38.9	52	
1.15	39.7	42	
1.55	40.7	42	
2.5	41.6	...	Dog killed.

On inspecting Fig. 6, corresponding to this experiment, it will be seen that after a faradic stimulation of the sciatic the arterial pressure became increased, while the kidney underwent but a very slight enlargement. At first sight it might be supposed that the kidney trace ought to follow in parallel lines that of the arterial pressure, rising and falling with it, but that it does not do so, but remains, on the whole, nearly parallel to the abscissa, may be explained by the fact that when the renal nerves are severed, the capillaries, owing to lack of tonus, at once dilate nearly to their maximum capacity, and being thenceforth always in a state of engorgement, cannot be filled much fuller, even when a general rise of arte-

¹ Fr. Nöllner, Die Anatomie des Splanchnicus und der Nierenerven beim Hunde. Eckhard's Beiträge zur Anatomie und Physiologie. Giessen, 1869.

Fig. 6.



rial pressure occurs. That the arterial tonus is much diminished, if not gone entirely, is confirmed by the separate pulse-waves of enervated kidneys being usually larger than of those in which the nerves have been left intact.

It was several times observed that strong faradic stimulations, applied to the sciatic immediately after the enervation, failed to produce any

contraction of the kidney, whereas, after an hour or two, when these stimulations were reapplied, a slight reaction of the organ was registered by the tracing; but the degree of this reaction was always very small compared to that of uninjured kidneys. This phenomenon may be explained by assuming that after the operation those nerves that had escaped being cut must, at all events, have been considerably bruised, and thus for a time rendered unfit for conducting purposes. After a period of rest, however, they recovered their function, allowing the reflex effects of a peripheral stimulus to reach the kidney, and to cause there a contraction of those few vessels, the conduction of whose nervous supply had not been permanently destroyed. So fine and almost invisible are the nerves that enter the kidney on the sheaths of the vessels that whilst it is possible to sever by far the greater number of them, some few are almost sure to escape in every case. Practically, however, the presence of these remaining fibres does not interfere with the interpretation of the result of the experiment, for the difference between the tracing of the non-enervated kidney of a fevering dog and the enervated organ is too striking not to be at once apparent.

Whilst the former, as we have seen, approaches constantly the abscissa as the temperature rises, *the mean curve of the latter pursues an almost parallel course.*

Spinal Cord.—Still another method of severing the connection between kidney and brain remained, and that was to perform section of the cord, but, as was expected in the beginning, the results obtained in this manner were not so satisfactory as those afforded by the direct enervation. The possible connections between brain and kidney by way of the sympathetic are so numerous and complicated¹ that, no matter at what level the cord is cut, one can never be sure of being above the point of exit of all the supplying nerve branches. Section of the cord, even when performed low down, has also the disadvantage that the arterial pressure subsequently sinks to a very low point, and that a rapid fall of temperature occurs. In consequence the dogs stand the operation badly; death occurring two or three hours after.

In every case where section of the cord was made, however, results tallying closely with those cases of enervation where it could be fairly assumed that a certain number of nerves had escaped, were obtained. It was found that the kidney tracing remained almost uninfluenced by the rise of bodily temperature, and that, although the kidney could be made to slightly contract by applying a very powerful faradic stimulus directly to a bared nerve, as the median or sciatic, yet this reaction was almost nil when compared to that which takes place when the cord is intact.

Local Fever.—Further determinations regarding the central or peripheral origin of the renal contraction were made by causing a local fever, as

¹ Nöllner, op. cit.

it were, in the brain, whilst the kidney and the rest of the body remained of normal temperature. This was done by means of the apparatus invented by Goldstein for studying the dyspnœa of fever.¹

This apparatus (see Fig. 3, No. 2) consists of a brass water-jacket fitting pretty closely around the carotid, and through which hot or cold water can be made to flow from vessels connected with it by rubber tubes. In order to insure a more prompt heating of the brain each carotid was provided with such a jacket, and the water was made to pass through both simultaneously. Between the hot jackets and the surrounding tissues several layers of thick, dry filter paper were laid which were found sufficient to prevent the vagus and other nerves being irritated by the heat.

Hot water of a measured temperature was allowed to run through for a certain length of time, a mark being made on the trace at the beginning and at the end. After the hot, some cold water was run through the brass jackets to cool them.

It was noted in all the experiments that in a few seconds after the hot water had entered the jackets the tracing registered a contraction of the kidney, while the general arterial pressure gradually rose. There was a latent period of varying length before the contractions began, and they lasted a short time after the hot water had been shut off and cold had been turned on, the kidney resuming then quite, or very nearly, its original volume and the blood pressure falling to its former height.

This reaction to a direct *central* irritation appeared so constantly and with such promptness that no misinterpretation of its significance was very well possible.

It may be remarked, by way of parenthesis, that we were fully able to corroborate Goldstein's observations regarding the dyspnœa that occurs during the temporary heating of the brain by hot blood, inasmuch as the appearance of rapid respiratory movements, becoming in some cases almost convulsive in nature, were regularly noticed every time the blood in the carotids was heated.

It might perhaps be urged that the change in the kidney was due reflexly to the sensation of asphyxia present, as shown by the dyspnœa, and of which the violent attempts at respiration were the exponent. That this however was not the cause, was proved by the arterial pressure remaining unchanged. Ordinarily, when asphyxia is produced, the general arterial pressure begins to rise a few seconds before the kidney begins to contract.

Taking the results of all the experiments made into consideration, we think it justifiable to draw the following conclusion :—

¹ Ueber Wärmedyspnoë, L. Goldstein. Arbeiten aus dem physiologischen Laboratorium der Würzburger Hochschule. A. Fick, 1872.

The decrease in the bulk of the kidney during fever is due to a contraction of its vessels which, in all probability, is the result of a stimulus conveyed to them from the central nervous system; the stimulus being the consequence of irritation of the central vaso-motor centres by the abnormally hot blood circulating through them during fever.

We have purposely said "in all probability," for Mosso,¹ in his investigations into the properties of the walls of the bloodvessels, has found that a contraction or dilatation of the vessels of extirpated kidneys takes place according as certain drugs, such as atropine, nicotine, etc. etc., are added to the blood with which these kidneys are fed. Still, however instructive these results may be from a purely physiological point of view regarding the vessels only, and not the kidney as a whole, they should hardly be considered as having too much weight when applied to the results of this research, because the kidney as it exists and functionates in the body of a living animal is, after all, a thing very different from one extirpated, even though the latter be kept, so to speak, *alive* for days, as in Mosso's experiment, by maintaining an artificial circulation through it. From this reason we refrained from repeating Mosso's experiments, and using hot blood, considering that no matter what the results might be they would be of little value in this case, in either proving or disproving the *central* origin of the vascular contraction.

General Conclusions.—From the experiments made we have proved:—

1. That in dogs with fever the kidney undergoes a diminution in its bulk.
2. That this diminution is due to a contraction of the walls of the bloodvessels; and,
3. That it is constant and progressive, being proportionate to the intensity of the fever.
4. That it is in all probability the result of a nervous stimulus, originating in the central (cerebral) nervous system from the irritation of abnormally hot blood circulating there.

From the intimate relations existing between the arterial pressure and the secretion of the urine, it will at once be evident that many of the changes occurring in the latter during fever may be readily explained by considering the above-named facts. Thus the *decrease in the amount of urine* secreted by fever patients, which has heretofore been ascribed to the increased loss of water through the lungs and skin (and which may amount to one-half,² or even a third,³ of that normally secreted), becomes all the more explicable when the marked contraction is considered, which we have here shown that the renal vessels undergo during fever. For in this case

¹ A. Mosso. Von einigen neuen Eigenschaften der Gefässwand, Ludwig's Arbeiten, 1874.

² Cohnheim, Allgemeine Pathologie, vol. ii. p. 568, 2d ed. Berlin, 1892.

³ Senator, Untersuchungen ü. d. fieberhaften Process. etc., p. 123. Berlin, 1873.

it is immaterial whether we accept the theory of Ludwig and his pupils, that the amount of urine secreted is dependent on the height of the arterial pressure in the kidney, or that of Heidenhain, that it is due to the rapidity of the blood-current in the renal vessels. In either case the great contraction of the kidneys' vessels would produce both a diminished blood-pressure and a retarded current within the organ, and hence a lessened secretion of urine.

The occurrence of *albuminuria*, such a constant symptom in nearly all high fevers, becomes readily understood when we bear in mind the extreme anæmia which we have seen affects the kidney during a hyperpyrexia. For nearly all authorities are now agreed that albuminuria is due to the glomerular epithelium, in consequence of being insufficiently nourished with arterial blood, losing its function of retaining within the vessels the albuminous portions of the blood plasma.¹ The extreme sensitiveness of the renal epithelium generally to anæmia, whether partial or complete, has been shown by many observers,² and it is not surprising therefore, that in consequence of the prolonged and marked anæmia in the kidneys of fevering individuals, the epithelium should be so profoundly affected as to seriously impair its function, and allow it to become permeable to albumen.

It must be remembered that the foregoing experiments relate to fevers which, however high, were but of some hours' duration, and which would therefore come under the head of acute. It may not be out of place, however, to call attention to the fact that even in those cases of excessively high temperature, one example of which is recorded in Experiment No. 8, p. 393, where toward the close, when death was imminent, and it is probable that a general relaxation of all the vital functions was occurring, as is shown by the irregular and feeble action of the heart, and the presence of the marked Traube-Hering curves (Fig. 4, toward the end, at T. 42.4°), still, even in these instances, we say, the kidney remains in a state of complete contraction to the last. We point to this as having some analogy, perhaps, to cases of chronic fever, where what the temperature fails to attain by intensity, it makes up by quantity and duration; and that even in chronic fever the condition of the kidney, as regards its circulation, may possibly not be different to that in acute attacks. This is but a surmise which would need the test of further experiment to prove or refute.

Many other interesting questions to be solved in this connection present themselves. Thus, the actual measurement of the urine during an experimental fever to determine the mutual relations between the amounts secreted, the temperature, and the degree of contraction of the kidney.

¹ R. Heidenhain, Hermann's Handbuch der Physiologie, vol. v. p. 371, 1881. Cohnheim, Allgemeine Pathologie, 2d ed., vol. ii. p. 321, 1882.

² Max Hermann, Sitzgsber. d. Wiener Acad. Math. phys., Cl. lxx., 1861. R. Overbeck, same, lxxvii., 1863. M. Litten, Untersuchungen über den hämorrhagischen Infarkt. Berlin, 1879; and others.

Then the relation between the renal circulation and the cutaneous. All these and many more require to be investigated before our knowledge of the renal circulation during fever will be in any sense complete. Incomplete in many ways as the author feels this research to be, he offers it as the first contribution toward the founding of an understanding of the renal pathology of fever based on experimental investigation, hoping it may be but the beginning of a series which will clear up this most important subject. For at present we have been groping in the dark, forced to content ourselves with theories based on analogies, and having actually no *positive* data based on experiment on which to found our views.

APPENDIX.—Although not strictly belonging here, we think it well to record the following observations noted in the course of the experiments:—

In a number of cases it was found that the arterial pressure rose with the increasing bodily temperature of the dog, a diminution occurring when the temperature had risen to a point incompatible with life, and when a general state of collapse had begun.¹ If, after the arterial pressure had risen in consequence of fever, the dog was cooled off, not only did the blood-pressure sink again, but the kidney increased in volume.

The following are some tables giving the amount of arterial pressure at different temperatures.

Experiment No. 8.—Thermic fever. May 25th, 1882.

Time.	Temp. of dog.	Arterial pressure.	Temp. of box.
12.20	38.8° C.	104 mm. of Hg.	46° C.
12.30	39.2	104 " "	46
12.55	40.2	112 " "	47
1.5	40.6	114 " "	47
1.15	41.4	116 " "	47
1.30	42	116 " "	49
1.45	42.4	130 " "	49
2	42.4	136 " "	48
2.7	43.3	140 " "	50
2.15	44	120 " "	49
2.20	44.2	112 " "	48
2.28	44.4	80 " "	50
3.10	Dog died.		

On inspecting Fig. 4, of Experiment No. 8, it will be seen that the Traube-Hering waves become very marked, and the individual heart-beats very small and frequent as the temperature approaches lethal limits, though the mean arterial pressure does not begin to fall until some time after both these phenomena have put in their appearance. It is highest at 42.4° C. (136 mm. of mercury), and then rapidly falls, being twenty minutes after, at the time of death, but 80 mm., the temperature being then 44.4°.

¹ Senator, *Die Albuminurie im gesunden und kranken Zustande*, p. 45. Berlin, 1882. See, also, Paschutin, *Ludwig's Arbeiten*, 1873, p. 229, and Zadek, *Zeitschrift für klinische Medizin*, vol. ii. p. 509.

Experiment No. 9.—Thermic fever. June 8th, 1882.

Time.	Temp. of dog.	Arterial pressure.	Temp. of box.
1	37.8° C.	112 mm. of Hg.	...
1.40	38.5	100 " "	48° C.
2	39.5	110 " "	52
2.16	40.2	120 " "	52
2.25	40.8	130 " "	52
2.40	41.8	144 " "	52
2.50	42	172 " "	52
3.10	41.1	134 " "	30 { Box
3.15	41	140 " "	25 { cooled
3.25	40.6	148 " "	24 { off.
3.30	Dog died from hemorrhage from the carotid.		

In Experiment No. 9 a continuous rise of arterial pressure, going hand in hand with the increased bodily temperature, took place until the former registered 172 mm. at 42° C. The box being then cooled by allowing cold water to flow through it, the temperature of the dog fell, and with it the blood pressure; the kidney increasing in volume at the same time.

Experiment No. 24.—Pepsin fever. June 30th, 1882.

Time.	Temp. of dog.	Arterial pressure.	Respirations.
11.15	36.9° C.	120 mm. of Hg.	...
12.30	37.5	134 " "	...
1.15	37.9	134 " "	...
1.30	38.3	138 " "	...
2.20	38.8	138 " "	...
2.52	39.2	156 " "	...
3.20	39.6	156 " "	...
4.15	40	156 " "	...
4.30	40.2	158 " "	...
5.30	40.5	160 " "	130
6.5	40.5	140 " "	180
6.30	40.1	160 " "	34 Irregular.
6.40	40	160 " "	20 "
6.50	Dog killed.		

In Experiment No. 24 a continuous rise of arterial pressure took place to the end, when the dog was killed, the temperature being 40° C., and the arterial pressure 160 mm.

Experiment No. 25.—Pepsin fever. July 3d, 1882.

Time.	Temp. of dog.	Arterial pressure.
11.45	38.6° C.	124 mm. of Hg.
12.20	38.2	108 " "
1	38.7	116 " "
1.55	39.3	118 " "
3	40.2	126 " "
3.40	40.5	120 " "
4.50	41.2	140 " "
5.10	41.7	136 " "
5.55	41.9	120 " "
6.10	41.8	104 " "
6.20	Dog killed.	

Here the pressure increased till it was 140 mm. at 41.2° when it began to decline, the temperature still rising. At 41.8° the dog was killed, it having then sunk to 104 mm.

ARTICLE V.

CALCULOUS AND OTHER AFFECTIONS OF THE PANCREATIC DUCTS.¹ By GEORGE WOODRUFF JOHNSTON, A.M., M.D., Senior Assistant House Surgeon in the Woman's Hospital, New York City; late House Surgeon in the Hospital of the University of Pennsylvania, Philadelphia.

THE earliest writer who mentions the subject of Pancreatic Calculi is Regnero de Graaf, who wrote in 1671. Since then instances have been met with from time to time, and recorded with more or less accuracy by writers both in Europe and in this country, the most recent being a case under the charge of Dr. William Pepper, at the Hospital of the University of Pennsylvania, in 1880. Altogether we have been able to collect *thirty-five cases* in which, upon post-mortem examination, stony concretions were found in the pancreas. We cannot but believe that calculi are present in the pancreas far oftener than is supposed, and we can only attribute the paucity of medical literature upon the subject to the inexperience or carelessness of the diagnostician or pathologist.

In spite of the many difficulties which always attend the efforts of a collaborator, we have succeeded, we think, in obtaining a fair amount of material upon this subject, and we have endeavoured in these "Extracts" to summarize as much as possible the results of our work upon the pathological anatomy and symptomatology of calculous and a few allied affections of the pancreatic ducts.

I. PATHOLOGY AND MORBID ANATOMY.

1. *Varieties of Calculous Concretions found within the Pancreas.*—Before proceeding to a minute description of the calculous formations having their origin within the pancreas, it is well at the outset to refer briefly to the varieties into which such formations can be classed, and to mention—

- a. Free concretions,
- b. Calculous incrustations of the duct walls, and
- c. "Acne pancreatica,"

as three general heads, under one or the other of which, all the instances of pancreatic calculi, contained in the reported cases, can easily be grouped. By far the greater number of stony formations observed belong to the class of free concretions; but the other two conditions, though rare, have been sufficiently well described to render the distinctions between the classes clear.

a. *Free Concretions.*—It is difficult to give any generalization based upon the observed cases of free concretions, as the older writers adopted

¹ Extracts from Inaugural Thesis, University of Pennsylvania, 1882.

the most arbitrary standards of comparison, and as the reports of later authors are to a great extent incomplete. We have attempted to record, in the form of a table, all the instances which it has been possible to collect, in such manner as will most clearly present their many differences and peculiarities to the eye of the reader. (See table, pp. 406 and 407.)

b. Calculous Incrustations of Duct Walls.—It occasionally happens that the inorganic constituents of the pancreatic juice, instead of being precipitated in the form of a free concretion, crystallize upon the walls of the ducts.¹ Calculous incrustations are thus formed, which occur as single points, or plates, or else layers covering the whole duct wall.² The origin of the two hollow concretions, described by Henry and Matani, can possibly be explained in this way,³ although that mentioned by the latter seems to be more of the nature of a free concretion, and has been considered as such. And yet both were large, adherent to the interior of the pancreas, were hollow, and contained within their cavities a fluid (in the one case milky-white, in the other green), in which small granular concretions were suspended.

It is well known that one of the changes which occur in the walls of the so-called *kyste confirmé* is a chalky precipitation, sometimes so extensive as to cover its whole internal surface.⁴ In one of the cases reported by Recklinghausen, the cyst found in the pancreas was beyond question the result of the complete occlusion of the duct of Wirsung (by a calculus), and its subsequent dilatation. The contents of this cyst were made up in great part of altered pancreatic secretion, and its walls were studded in some places with thick white plates; in others with grayish layers, which glistened like mother-of-pearl; while in others still they were covered only by a thin film.⁵ It seems to us that this description agrees exactly with that already given of lime incrustations upon the inner wall of the pancreatic ducts, and it does not appear unlikely that we have here an example of such an incrustation formed simultaneously with the production of the calculus, and before any dilatation of the duct

¹ Klebs, Handbuch der Patholog. Anat., Berlin, 1876. Pankreassteine. 1 Bd., s. 544. Delafield, Handbook of Post-mortem Examinations and of Morbid Anatomy, New York, 1872: The Pancreatic Ducts, p. 203.

² Klebs, *ibid.*

³ Matani, Naturen genees-kundige Bibliotheek—door Eduard Sandifort, Gravenhage, 1765: Waarneeming van Antony Matani, over eene steenagtige samengroeiing van het alvleesch, in het lyk van een' mensche gevonden; or, Gottingische Anzeigen von Gelehrten sachen, No. 10, 1765. Antonii Matani observatio de lapidea pancreatis concretionem in humano cadavere reperta..... Henry, Journal de chimie médicale, iv. série, Paris, 1855: Recherches analytiques sur une concretion particulière du Pancréas, tome i. p. 273; or, France médicale et pharmaceutique, 3e Année, Paris, 1856: Sur les conerétions que présente le pancréas, No. 6, p. 42..... Klebs, *ibid.*

⁴ Klebs, *op. cit.* s. 547.

⁵ Recklinghausen, Virchow's Archiv, Berlin, 1864: Auserlerne pathologisch-anatomische Beobachtungen, I. Drei Fälle von Diabetes Mellitus, a. 30 Bd., s. 360.

Author.	Date.	No. of calculi.	Weight	Size.	Shape and surface.	Colour.	Fractility	Chemical analysis.	Remarks.
Do Graaf,	1671	7 or 8	....	"Large as chick pea."	Irregular and sharp edges.	1 part black	.....	Fused, became black, lost weight.	Odour of font water; no taste.
Morekkin, ¹	1678	1	....	"Larger than an almond."				Soluble in aqua fortis and solution of saliv., not in alkalies;	
Ellor,	1755	1	....	"Considerable."				yellow precipitate with Hg ₂ Cl ₂ .	
Gallati,	1758	20	....	"Little."					
Matani,	1765	1	3j	"Thick as little finger of full grown person."	Irregular, like a piece of coral.	White, yellow, coppery spots	.....	
Fournier,	1776	9	....	.....	Triangular.	White	.....	
Cawley,	1788	Pancreas full of calculi.	....	Varied; none larger than a pea.	Irregular, like mulberry stones	White	.....	Powder freely soluble in hot water.	Taste flat and insipid like saliva.
Salgado, ¹ (Portal's 1st)	1797-8	12	....	Varied; some large as hazel-nut.	Round.	Whitish	.....	Soluble in HCl; CO ₂ extricated. Composed of carbonate of lime.	Pomberton, 1890, examined one of these, and found it composed entirely of carb. of lime.
Baillio,	{ 1812 } { 1833 }	A number.	....	Kernel of hazel-nut.	Irregular.	White	.....	
Elliotson,	1823	Pancreatic and larger branch ducts crammed.	....	.....	.....	White			
Bizaby, Bonetus.	1835								
Schumpman, 1	1841	1	5ij 3j	Length 1-6 lines; diam. 5-6 lines.	Cylindrical, irregular, covered with projections.	Grayish or yellowish white			
" 2	....	2	2j	Length a few lines.	Irregular.	White			
Elliotson,	1846	100 at least.	....	.....	Similar to Balliol's drawings.	.....	.....	Made up of carbonate of lime.	
Gould, 1	1847	In cyst wall several; in duct 3; half filled.	....	Very minute; diam. 3-4 lines.	Rough.	.....	.....
" 2	....	Several.	....	.....	.....	.....	.....	Carbonate of lime, traces of phosphate of lime, animal matters, and fat.	
Clayton, ²	1849	Numerous; one escaped.	....	Length $\frac{2}{3}$ inch.	.....	.....	.....
Dufresno, 1 Portal's 2d	1851	In cyst many pancreatic and biliary cal.	....	Granular.	Unequal.	.....	Hard		

¹ In Morekkin's case, three large and several small pancreatic calculi were found in an abscess in right lumbar region.

² In Clayton's case, one pancreatic calculus escaped into peritoneal cavity; it was two-thirds inch long, and consisted of carbonate of lime, traces of phosphate of lime, animal matter, and fat.

Author.	Date.	No. of calculi.	Weight	Size.	Shape and surface.	Colour.	Friability	Chemical analysis.	Remarks.
2 Muhlbauer	....	In pancreatic abscesses great variety of calculous matter.	....	From grain of sand to size of lentil.	.....	.....	.....	Consisted probably of carbonate and phosphate of lime.	
Clark,	1871	Mass of calculous matter.	....	.....	Irregular and rough.	Glistening white	.....	Consisted probably of hard insoluble protein, which had great similarity of reaction with that contained in semen. Identical with the kind of albumin described by Bernard.	
Virchow,	1852	Twice met with concretions in excretory duct of pan.	....	.....	.....	.....	.....	Composed of mixed carbonate and phosphate of lime.	
McCready,	1856	1	....	Length 1 inch; diam. $\frac{1}{4}$ inch.	.....	.....	.....	Carbonate and phosphate of lime.	
Rockingham-son,	1864	1	....	.....	.....	.....	.....
2(a)	....	Small particles of calculous matter suspended in whitish tenacious fluid.	....	.....	.....	.....	.....
(b)	....	2	....	(1) 1 inch long, $\frac{1}{4}$ inch thick. (2) $1\frac{1}{4}$ inch long, $\frac{1}{2}$ inch thick. (3) Smaller particles.	Spindle-shaped. Granular surface distinguished later (2).	Grayish white	Brittle		
Corrill and Ranvier,	1869	Not specified.	....	.....	Irregular.	White	Friable	Carbonate and phosphate of lime.	The calculi were in a thick, white pulp, and probably well incrustated.
Janovray,	1872	A number.	....	Small.	Irregular.	Whitish	Fragile	Probably of carbonate and phosphate of lime.	
Curnow,	1873	19. Ducts and smaller radicles studded.	....	Varied; length $\frac{1}{2}$ to 1 in.; breadth $\frac{1}{3}$ inch.	Worm-eaten appearance.	Whitish, when rubbed had enamel lustre; glistening, porcelain-like fracture	.....	Organic matter 24 parts. Fixed salts 76 parts. 100 parts. Chlofay carbonate of lime.	
Pepper, U. S. Reports	1880	Pancreas involved in a large tumour containing calculi.	....	.....	.....	.....	.....	.....	Along course of duct were cysts, some containing calculi.

NOTE.—The description of pancreatic calculi embodied in this Table are as far as possible in the words of the authors quoted.

occurred. If this is so, many of the incrustations found upon the inner wall of pancreatic retention cysts are the result of the precipitation of the inorganic constituents of the secretion upon the duct walls prior to their dilatation, and therefore should not be ascribed to the later changes occurring in the cystic walls, nor be compared to the results of a prolonged endo-arteritis.¹

c. Acne Pancreatica.—The condition, sometimes met with in the pancreas, described by the pathologist Klebs, and called by him *Acne Pancreatica*, seems to have almost entirely escaped the notice of former investigators,² and Klebs himself fails to mention it in his article upon pancreatic concretions.³ The pathological process involved consisted in a change of the normal pancreatic secretion into a fatty, chalky pap.⁴ In the only case observed with any care, the exterior of the gland was covered by large light-yellow spots, which, like the acini, occupied a certain depth, and consisted of a thick, smeary, butter-like substance containing fat. The pancreatic duct was dilated and filled, as were the accessory ducts, with a pap-like mass, which contained pus elements and light particles of hardened protein.⁵ Yellow spots similar to those above referred to, and having the appearance of blisters, were found by Klebs upon the surface of an enlarged pancreas. It is believed that these were cysts formed by the dilatation of the smaller branch ducts, and the clear or clouded semifluid mass which they contained was found to be composed partly of fat-globules, and partly of some cretaceous material. These spots may easily be mistaken for abscesses; for those small cysts which are only occasionally present in the acini, and are of no pathological importance; and, finally, for the small spots (from which chalk or tufts of fat-crystals can be expressed) found in a gland which has been the seat of chronic pancreatitis from obstruction of the portal vein.

Only a few other cases have been met with which seem to us illustrative of the condition just described, viz., *acne pancreatica*. In them either the pancreatic ducts were found full of a chalky powder,⁶ of an earthy, doughy substance,⁷ or else the whole gland was converted into a tophaceous

¹ Klebs, *op. cit.* s. 547.

² Klebs, *op. cit.* s. 547.....Gendrin, *Histoire Anatomique des Inflammations*, Paris, 1826 : *Pancréatites chroniques*, tome ii. p. 263.

³ Klebs, *op. cit.* s. 544.

⁴ Gendrin, *ibid.*

⁵ Virchow, *Verhandlungen der med. physik. Gesellschaft zu Wurzburg*, 1852 : *Zur pathologisch-anatomischen Casuistik*, 4, III. Bd., s. 366, cf. II. Bd., s. 53.....Klebs, *op. cit.* s. 547.....Friedreich, *Ziemssen's Encyclopedia of Medicine*, New York, 1878 : *Diseases of the Pancreas, Cysts*, vol. viii. p. 615.

⁶ Wilson, *Medico-Chirurgical Transactions*, London, 1842 : *An account of a case of extensive disease of the pancreas*, vol. xxv. p. 42.

⁷ Schmitt, *Zweifelhafte Schwanger*, Wien, 1818.....Klebs, *op. cit.* s. 547.....Cornil et Ranvier, *d'Histologie Pathologique*, Paris, 1869-1873 : *Kystes*, t. ii. p. 974.....Cornil and Ranvier, *Manual of Pathological Histology*, translated by Shakespeare and Simes, Phila. 1880 : *Cysts*, p. 531.

or calculous mass.¹ It may be here remarked that the chemical composition of such deposits differs in no way from that of free concretions.

The cause of the formation of chalky masses or concretions in the pancreatic ducts, or in the small retention cysts above described, is without doubt either a chemical alteration, brought about in the secretion of the gland through contact with the inflamed duct walls, or else an obstruction offered to the free outflow of the secretion by a local interstitial inflammatory thickening, or a catarrhal swelling of the lining membrane of the duct of Wirsung, or of any of the accessory ducts. The question of causation will, however, be dwelt upon at greater length in a later section.

2. *Location of Calculous Deposits.*—The seat of the various concretions found within the pancreas can, we believe, be most clearly shown by the subjoined analysis. It may be mentioned, however, that, in the only instance of calculous incrustation of the duct wall in which the seat of this incrustation is specified, the part of the duct of Wirsung situated midway in the gland was alone affected. With regard to the condition spoken of as *acne pancreatica*, a sufficiently detailed description has been already given. We will proceed then to the remaining class, viz., Free Concretions.

Free Concretions.

	Seat.	No. of instances.
I. Found in duct of Wirsung only. {	Exit	3
	Middle	1
	Tail . . . . .	...
	Not specified	3
	Total	7
II. Found in branch ducts and in duct of Wirsung {	Exit . . . . .	...
	Middle	1
	Tail	1
	Throughout	7
	Not specified	2
	Total	11
III. Seat not specified	Total	3
IV. Found in abscess in pancreas . {	Head	1
	Centre	1
	Total	2
V. Found in cyst of pancreas . . {	Head	3
VI. Exceptional cases {	In abscess in right lumbar region	1
	In peritoneal cavity	1

¹ Meckel, Koreff, *Dissertatio inaug. med. sist. theoret. consid. icteri*. Halæ Magd., 1759, § 12, p. 16.

3. *Mode of Origin of Pancreatic Concretions*.—Although the origin of pancreatic concretions depends upon some special functional or structural alteration in or about the gland, yet we must consider these, in some cases, as the mere local manifestations of some general morbid condition. Disregarding the study of these general conditions, it will be necessary in the present section to refer to such local alterations only as are immediately connected with the production and development of these concretions. For the sake of clearness we will divide these alterations into two classes, namely: Changes in the gland itself, or in the chemical composition of its secretion; and Changes in the structure or relation of the surrounding tissues or organs.

Among the many modifications, both functional and structural, of which the pancreas is the seat, those only are directly connected with the formation of calculi which tend to prevent the free outflow of the pancreatic juice. A morbid change in any part of the gland structure,¹ especially at its head;² a mucus plug,³ or an already formed calculus lodged in the duct of Wirsung or any of the larger ducts; a catarrhal⁴ or chronic inflammatory condition with thickening of the same;⁵ an interstitial inflammation with hyperplasia of connective tissue;⁶ or a biliary calculus which has found its way into the pancreatic duct;⁷ are some of the many causes which go far to explain the origin of pancreatic calculi. The conditions

¹ Rokitsansky, A Manual of Pathological Anatomy, Syd. Soc., London, 1849: Abnormalities of the different ducts and their contents, vol. ii. § 2, p. 180.....Portal, Cours d'anat. méd. Paris, 1803; Pancreas engorgé par des concrétions pierreuses, t. v. p. 356.....Salmade, Recueil périodique de la Société de Médecine de Paris, 1797-98: L'observation à l'histoire des anévrysmes, tome iii. p. 454.....Dufrèsne, Traité de l'affection calculuse du foie et du pancreas, Paris, 1851: Article deuxième, p. 494.....Schupman, Hufeland's Journal, 1841, iii. Geschichte einer scirrhusen Hypertrophie der Leber und des Pankreas, etc., xlii. Bd., s. 41.....Wilson, loc. cit.....Curnow, Trans. Path. Soc., London, 1873, 23: Pancreas with numerous calculi in its ducts, vol. xxiv. p. 136.....Muhlbauser, Neue Notizen (von Frierip) Weimer, 1822-1847.....Devilliers, Revue médicale, Décembre, Paris, 1844, tome iii. p. 576.....Eller, Collection Académique, Paris, 1755. Recherches sur la formation des pierres ou concrétions, gravelleuses dans le corps humain, etc. Partie Etrangère, tome x. p. 85.....Sandifort, Observationes anatomico-pathologicae, Lugd. Batav., 1777. Lib. iii. cap. iv. p. 73.....Virchow, loc. cit.

² Cawley, London Medical Journal, 1788: A Surgical Case of Diabetes, etc., vol. ix. part iv. p. 286; also Sammlung Auserlerner abhand., Leipzig, 1789, 13 Bd., s. 112.....De Graaf, Tractat anat. med. de succi pancreatici natura et usu., Lugd. Batav., 1671, cap. vii. p. 112.....Lieutaud, Hist. Anat. Med., Paris, 1767, liber i. § viii. obs. 1045, p. 244.....Janeway, New York Medical Record, 1873: A case of Calculi of the Pancreas, etc., vol. vii. p. 357.

³ Rokitsansky, *ibid*.

⁴ Curnow, *ibid*.....Friedreich, op. cit. p. 615, and Calculi, p. 618.....Klebs, op. cit. s. 547.....Parsons, British Medical Journal, 1857, vol. i. p. 475.

⁵ Recklinghausen, op. cit. b. Concretionen, Ektasien des Ductus Veröderung des Parenchyms des Pankreas.

⁶ Delafield, op. cit. p. 202.....Friedreich, op. cit. p. 615.....Parsons, loc. cit.

⁷ Klebs, op. cit. s. 544.....Delafield, op. cit. p. 203.

are varied, it is true; the effects the same. Let there be an obstruction, a compression, a complete occlusion of the duct internal to the gland, and the secretion is dammed back, it accumulates and stagnates when it should escape, and those conditions most favourable to the precipitation of its inorganic constituents are all thus furnished. But who can say that there are not other and more remote causes, in addition to those which have been already mentioned? Is compression or complete occlusion of the ducts necessary? In atrophy, in morbid softening, especially in fatty metamorphosis of the gland structure itself, and lastly in scirrroid induration, the tissue of the duct becomes involved, the vital contractility is lost, dilatation ensues with stagnation of the secretion,¹ and the same effect is brought about in an entirely different manner. Instead of dilatations and cysts being the result of duct occlusion, by a stone already formed, they have here become the cause of its formation, and yet it is in some cases most difficult to say, from a study of pathological appearances, which is the cause, and which the effect.²

It is clear, then, that an obstruction to the free outflow of the pancreatic secretion will cause retention and accumulation of that fluid within the ducts of the gland, and thus favour the precipitation of its inorganic constituents. But it is possible that the secretion may become so altered in the nature or relation of its chemical components, as to bring about a deposition of its inorganic elements, without any preliminary obstruction or dilatation of the gland ducts. From a study of the reported cases of calculous disease of the pancreas, it will be seen that in many instances calculi have been found within the gland *where no obstruction of the ducts had existed*, such as described in the foregoing and succeeding pages.³ It now, therefore, remains to be seen what are the changes in the pancreatic secretion which result in the formation of calculi, and how these changes are brought about. By a comparison of the chemical constitution of the normal pancreatic juice with that of pancreatic calculi, one will be struck by the following facts: In three analyses given of the former, lime, whether in combination with organic matter, or as free phosphate of lime,

¹ Rokitsky, loc. cit.

² Gould, Catalogue of the Anatomical Museum of the Boston Society for Medical Improvement, Boston, 1847: Several pancreatic calculi, extensive disease of the pancreas, § § 575-6, p. 173.....Dufresne, loc. cit.

³ Matani, loc. cit.....Baillie, The Morbid Anatomy of the Human Body, London, 2d ed. 1812, p. 115, and, London, 1833, Calculi of the Pancreas, p. 222.....Elliotson, The Principles and Practice of Medicine, 2d ed., London, 1846: Diseases of the Pancreas, p. 1009; also, Medico-Chirurg. Trans., London, 1833, on The Discharge of Fatty Matters from the Alimentary Canal and Urinary Passages, vol. xviii. p. 67.....Bonetus, vide Bigsby, loc. cit.....Gould, op. cit. § 575.....Clayton, Medical Times, London, 1849: A case of Calculi of the Pancreas, etc., vol. xx. p. 37... Henry, loc. cit.....McCready, New York Journal of Medicine, 1856: A case of Pancreatic Calculi, in Proceedings of Patholog. Soc. p. 78.....Recklinghausen, op. cit. 1, a. p. 360.....Cornil et Ranvier, loc. cit.....Cornil and Ranvier, trans. loc. cit.....Schmitt, loc. cit.

is present only in very small amount, or, as in a fourth analysis, is not mentioned at all; whereas, in the various chemical examinations made of the latter, lime, both as a phosphate and as a carbonate (an element not found at all in normal pancreatic juice), is present in very large amount, and forms either the entire calculus,¹ or else by far the greatest part of it.² In addition to the carbonate of lime already mentioned, three other inorganic substances have been found in pancreatic calculi, which, according to the analysis above referred to, have no place in the pancreatic juice; they are the chlorate of sodium,³ carbonate of magnesium,⁴ and oxalate of lime.⁵

In conclusion, let us bear in mind the close analogy which exists between the pancreas and its kindred salivary glands, in both of which calculi are found, produced by the same general causes, and followed by the same effects.⁶ How does the chemical composition of salivary calculi compare with that of the salivary fluid? It has been remarked, that the saliva from which salivary calculi are formed, must be in an unhealthy state, for, while these concretions consist chiefly of phosphate of lime, sometimes containing as much as ninety-four per cent. of that salt, little, if any, is to be found in the normal salivary secretion.⁷ From this it is clear, that in true salivary calculi, as in those of pancreatic origin, the quantity of the salts of lime is much greater than in the fluids secreted by these glands. The means, by which the pancreatic secretion is so changed inside the body as to bring about a precipitation of its inorganic constituents, must still remain a matter of doubt. Various explanations have been advanced, but none are entirely satisfactory. It is possible that physiological variations are occasionally present in

¹ See in Table of Free Concretions. Baillie, Gould, and Collard: Henry, *La France Méd. et Pharm.*, op. cit. p. 42.....Pemberton, on Various Diseases of the Abdominal Viscera, Richmond, Va., 1830: chap. iv. The Pancreas, p. 64.

² See in Table of Free Concretions: Clayton, Clark, McCready, Reeklinghausen, Cornil and Ranvier, Janeway, Curnon; also, Wilson, loc. cit., Rokitsansky, loc. cit.....Gross, *Pathological Anatomy*, Phila. 1845: Of the pancreas, chap. xxiv. p. 689.....Henry, *La France Méd. et Pharm.*, loc. cit. p. 42.....Wollaston, see Pemberton and Henry, *ibid.*

³ Henry, *ibid.*

⁴ Henry, *Journal Méd. et Pharm.*, loc. cit.

⁵ Golding Bird (See Wilks & Moxon, *Lectures on Pathological Anatomy*, Phila. 1875: Diseases of the Pancreas, Calculi, p. 470).

⁶ De Graaf, loc. cit., Eller, loc. cit., Matani, loc. cit., Rokitsansky, loc. cit., Henry, *La France Méd. et Pharm.*, loc. cit.; Friedreich, op. cit. p. 618; Wilks & Moxon, loc. cit., Portal, loc. cit.....Bécourt, *Recherches sur le pancréas*, Thèse, Strasbourg, 1830: Concrétions inorganiques, § 5, p. 69.....Mondière, *Archives Générales de Médecine*, ii. Série, Paris, 1836: Recherches pour servir à l'histoire pathologique du pancréas, tome xii. p. 147.....Bigsby, *Edinburgh Medical Journal*, 1835: Observations on Diseases of the Pancreas, vol. xlv. p. 97.....R. D., *Dictionnaire de Médecine*, Paris, 1841: Maladies du Pancréas, concrétions osseo-pierreuses, tome xxiii. p. 65.

⁷ Jones & Sieveking, *A Manual of Pathological Anatomy*, Phila. 1854: Abnormal conditions of the pancreas and other salivary glands, p. 532.

the composition of the pancreatic juice, as in the secretion of other salivary glands, in which occur temporary changes in quantity, in colour, in consistency, and, as indicated by the taste and alkaline or acid reaction, in chemical constitution.¹ Further, local changes in the tissue of the secreting portion of the pancreas,² or in that of its ducts, may produce such an influence upon the secretion as would lead to the crystallizing out of its less soluble salts. It has been said that the excess of phosphate of lime present in calculi is most probably caused by an irritation or inflammation of the mucous membrane lining the ducts,³ and if this be true, there can be but little doubt that an excess of this phosphatic salt, which, as we have seen, is present in nearly all pancreatic calculi, can be formed in like manner in the ducts of the pancreas.

It seems proper, before leaving this part of our subject, to record in brief the chemical analyses made of two pancreatic calculi, which, for obvious reasons, are not to be found in the list of free concretions,⁴ with the analyses of two salivary calculi, in order to illustrate the close analogy which is said to exist between pancreatic and the so-called salivary calculi.

1.⁵ A pancreatic calculus, wt. 9.06 gm., contained—

Phosphate of lime	72.80
Carbonate of lime	18.90
Phosphate of soda	traces
Chlorate of sodium	"
Animal matter	8.80

In 100.00 parts.

2.⁶ A pancreatic calculus found in canal of Wirsung of an ox contained—

Carbonate of lime	91.65
Carbonate of magnesium	4.15
Organic matter	3.
Water	1.20

In 100.00 parts.

3.⁷ A salivary calculus found in Steno's duct of a woman contained—

Phosphate of lime	55
Carbonate of lime	15
Animal matter	25
Oxide of iron	2
Magnesium	traces
Waste	3

In 100 parts.

¹ Rokitansky, loc. cit. Friedreich, op. cit. p. 618.

² Recklinghausen, op. cit. i. b.

³ Recklinghausen, ibid. Jones & Sieveking, loc. cit.

⁴ Henry, Journal de Chimie Médicale, op. cit. p. 273.

⁵ Henry, Journal Méd. et Pharm., loc. cit.

⁶ Schulze, Journal für p. Chemie, xxxix. p. 29: Rap. an de Berzelius, 1848, p. 412: cf. Henry, ibid.

⁷ Lassaigné, Traité de Chimie, tome ii. p. 614: cf. Henry, ibid.

4.¹ Another salivary calculus contained—

Phosphate of lime	.	.	.	.	.	.	.	75.
Carbonate of lime	.	.	.	.	.	.	.	20.
Animal matter	}	.	.	.	.	.	.	5.
Waste								

In 100 parts.

The changes in the parts or tissues adjacent to the pancreas, which are of force in the production of pancreatic calculi, are as numerous and as varied as those within the gland itself. Yet we will find the same thing here as there, different causes with like effects; an obstruction to the free escape of the pancreatic secretion, a stagnation, an inspissation, and the formation of a calculus, with all the train of phenomena attending thereon. And we repeat here what has been said in a former section, not only that calculi, by occluding the pancreatic ducts, cause their dilatation and the formation of retention cysts; but that these cysts, whether so formed or not, favour in their turn the production of calculi,² and that, therefore, whatever causes are assigned for the development of retention cysts can also be considered as secondarily productive of calculi. From a careful study of the cases of pancreatic calculi which we have collected, we find no instances in which the production of a concretion has been caused by compression of the excretory duct through changes outside of the gland; nevertheless, since such compression is possible, and may have been overlooked, we cannot refrain from briefly referring to some of the changes whereby it may be brought about. Among these may be mentioned peripancreatic induration and adhesions, especially near the head of the gland;³ gall-stones lodged in the common duct and pressing upon the duct of Wirsung;⁴ a cancerous growth in the duodenum;⁵ and, finally, changes, as the result of which the pancreas becomes displaced.⁶

4. *Mode of Escape of Pancreatic Calculi.*—Pancreatic calculi may escape into the duodenum, accompanied by a paroxysm of pain or colic, similar to that which attends the passage of biliary or of renal calculi.⁷ This, instead of being only a probable method of escape,⁸ is, we believe, not at all infrequent.⁹ No case in which a direct observation has been made can, however, be brought forward in proof of this assertion. As will be

¹ Lecannau, Journ. de Pharm. et de Chir., Décembre, 1827, p. 626.

² Virchow, Die Krankhaften Geschwülste, Berlin, 1863, i. Bd., s. 276.....Friedreich, op. cit. p. 615.

³ Hoppe, Virchow's Archiv, 1857, xi. Bd. s. 96: cf. Friedreich, *ibid*.

⁴ Engel, Oesterreich med. Jahrbücher, 1841: xxiii. u. xxiv. Bd.

⁵ Friedreich, op. cit. pp. 601-15.

⁶ Engel, *ibid*; Friedreich, *ibid*.

⁷ Friedreich, op. cit. p. 618.

⁸ Ancelet, Essai Analytique sur l'anatomie pathologique du Pancréas, Thèse, Paris, 1856, tome i. p. 27.

⁹ Pemberton, loc. cit., Portal, loc. cit.: cf. Dufrèsne.....Schupman, loc. cit., Wilson, loc. cit., Clayton, loc. cit.

discussed in a later section, it is almost impossible to tell from symptoms whether a pancreatic or biliary calculus is being passed, nor is it easy to recognize pancreatic concretions in the stools. It is, nevertheless, possible that in many of the cases which we have collected where, during life, pain, more or less characteristic, was present, and after death pancreatic, but no biliary calculi, were found, nature had sought this mode of relief.¹

It is known that calculi, acting as foreign bodies within the pancreas, sometimes give rise to inflammation and ulceration, with subsequent perforation of the gland substance. In one reported case perforation was found at the post-mortem examination, and, although several calculi had remained in the pancreas, one had escaped into the abdominal cavity. The patient's death was attended with symptoms denoting internal hemorrhage, and a large quantity of coagulated blood was found within the peritoneal sac.² In another case, the record of which is rather obscure, one concretion was found in the pancreas, and several others in an abscess, situated in the mesentery and opposite the point (the right lumbar region) where, during life, the patient suffered the greatest pain.³ Although no lesion of the pancreas was noted, it is not unlikely that the calculi escaped in the same manner as is mentioned in the last case. A later writer describes this abscess as peri-pancreatic, but we do not think that the original account warrants this construction.⁴

5. *Results following the Impaction of Calculi in the Ducts of the Pancreas.*

a. Dilatation of ducts and formation of cysts.

Hemorrhagic cysts.

Hemorrhage into the pancreas.

Dilatation of the ducts of the pancreas, with or without the subsequent development of cysts, is one of the results which most often follow the formation of calculi within the gland.⁵ Virchow, having in mind the close analogy (already pointed out) which exists between the pancreas and the salivary glands of the mouth, has given the name *Ranula Pancreatica*

¹ Wilson, loc. cit. Mercklin, *Ephem. nat. eur. decur.*, Frankfort und Leipsig, 1678: De ingen. calc. in mesen. et pan. repert, Ann. 8, obs. 50, p. 78. Galiati, *De morbus duobus observ.* 1758, p. 26; or *Comment. Bonon.* tome iv. p. 34. (NOTE.—It has been impossible to gain access to these two works. The case is quoted by Sandifort, Mondière, R. D., Bécourt, and by others.) Elliotson, *Med. Chirurg. Trans.*, loc. cit. Seligman, loc. cit., Gould, loc. cit., Clayton, loc. cit., Dufèsne, loc. cit. Clark, *London Lancet*, Aug. 16, 1851: A case of disease of the pancreas, etc. Fournier, *Ane. Journal*, tome xlv. p. 149; or, more correctly, the journal being better known under its more recent name, *Journal de médecine, chirurgie, pharmacie*, Paris, 1776, tome xlv. p. 149.

² Clayton, loc. cit.

³ Mercklin, *ibid.*

⁴ Klebs, *op. cit.* s. 544.

⁵ Matani, Baillie, Seligman, Gould, Rokitsky, Dufèsne, Clark, Virchow (*Verhand. der Med. physik. fii.*), Anelet, Recklinghausen, Cornil & Ranvier, Janeway, Curnow, Fournier, Meckel and Delafield.

to all dilatations of the pancreatic ducts leading to the formation of cysts.¹ This dilatation of the ducts of the pancreas is due to a distension of their walls by the mechanical pressure of a retained secretion. The degree of dilatation, other things being equal, is in direct proportion to the completeness of the obstruction to the outflow of the pancreatic juice. Although a calculous concretion is one of the usual and most effective causes of this obstruction, nevertheless many other changes, both within and without the gland, undoubtedly produce the same effect. These alterations have been already briefly referred to,² but many others exist which it is not our intention at present to describe.³ It suffices to say, given an impediment, complete or partial, to the free escape of the pancreatic secretion, and the most natural result is a mechanical distension and dilatation of the ducts behind the obstructed point.

Among the cases of pancreatic calculi collected, dilatation of the main duct is the result of obstruction the most frequently observed. Generally, this dilatation represents only an exaggeration of the normal calibre of the duct, which throughout the greater part of its length is more or less uniformly dilated.⁴ If, however, the obstruction is near the point of exit into the duodenum, and is complete and continued, the dilatation does not cease here, but the accessory ducts in their turn become enlarged,⁵ presenting the appearance of diverticula, opening into the duct of Wirsung, and separated from one another by valvular folds or transverse ridges, formed by the coats of the ducts, which may be either thickened or attenuated.⁶ Again, instead of these close-set expansions, there may exist at intervals single fusiform dilatations.⁷ It is possible for the accessory ducts to undergo dilatation without the involvement of the main duct. Thus they may become closed at their exit by the presence of a calculus, by local interstitial inflammatory thickening, or by catarrhal swelling of their lining membrane, with or without the collection of a stringy catarrhal secretion, the main duct remaining patent throughout. The degree of dilatation, depending as it does upon the conditions already pointed out, varies considerably in different cases. We have the size of the dilated main duct compared to that of a quill,⁸ of the thumb,⁹ it is said to be

¹ Virchow, *Die Krankhaften Geschwülste*, loc. cit. Parsons, *British Medical Journal*, June 15, 1857, vol. i. p. 475.

² Reference may here be made to the section on the Mode of Origin of Pancreatic Concretions.

³ Klebs, loc. cit.: Cysts, p. 547. Friedreich, loc. cit.: Cysts, pp. 600-15. Parsons, loc. cit. Cornil & Ranvier, loc. cit.: Kystes, p. 974 : Trans. Cyst., p. 531. Virchow, loc. cit. Ancelet, loc. cit.: Kystes, p. 26. Rokitsansky, loc. cit. Cruveilhier, *Traité d'anatomie pathologique générale*, Paris, 1856 : Kystes Pancréatiques, tome iii. p. 365.

⁴ Klebs, op. cit. s. 547. Meckel, Baillie, Gould (op. cit., § 575), Rokitsansky, Virchow, Ancelet, Recklinghausen, and Cornil et Ranvier.

⁵ Matani, Janeway, and Curnow.

⁶ Klebs, Rokitsansky, Friedreich, and Recklinghausen.

⁷ Rokitsansky.

⁸ Rokitsansky.

⁹ Matani.

dilated,¹ much dilated,² or prodigiously dilated.³ In one case only was an accurate measurement made, when the diameter of the duct was found to be one inch.⁴

The study of the cysts, or, as the Germans are pleased to call them, *Ektasien*, resulting from an extensive and continuous impediment to the outflow of the pancreatic juice, is an extremely interesting one, and will be briefly alluded to as one of the many results following the impaction of concretions. All such cysts found in the pancreas belong purely to the class of retention cysts, and although in some cases extensive secondary changes seem to render their origin doubtful, yet it is comparatively easy to exclude pouches beginning outside of the pancreas, even though pushing aside its glandular tissue, and entering into communication with its duct, aneurismal dilatations of arteries in the gland, and, finally, cysts originating from entozoic formation.⁵

Cysts of the pancreas present many varieties in form and size, have been studied with some care by pathologists, and are of the utmost symptomatological importance. Two distinct classes are met with: those which emanate in an extreme degree of dilatation of the main duct of the pancreas, and the small multiple cysts originating from a similar dilatation of the small ducts within the acini, or of the terminal vesicles of the gland. The former sometimes attain an immense size, in one case measuring three by four inches;⁶ in others compared to the size of a child's head.⁷ Their form is generally spherical or oval,⁸ but varies extensively in different cases.⁹

Whereas, in ordinary dilatation of the main or of the accessory ducts of the pancreas, and also in the first period of the history or development of a cyst, there is a simple retention of the secretion without any notable alteration in the walls of the duct or cyst, or in the secreting structure of the gland itself, yet, in the second period, in the *kyste confirmé*, changes occur which cannot be passed over unnoticed. Here the cyst walls become thick, fibrous, tough, cartilaginous, or even ossified. Their internal surface may be smooth, or may present changes similar to those which occur on the internal surface of arteries, namely, fatty or chalky precipitations or aggregations, such as are seen in the later stages of endoarteritis. In other instances the walls of very large or old cysts become the seat of albuminoid or of purulent infiltration. The mischief does not however stop here; the constantly enlarging cyst, with its thickened and hardened walls, encroaches upon the substance of the gland itself, and the

¹ Ancelet, Janeway.² Curnow.³ Baillie.⁴ Gould, op. cit. § 575.⁵ Recklinghausen, op. cit. i. a.⁶ Gould.⁷ Recklinghausen, Ancelet, Bécourt..... Duponchel, Soc. Méd. d'Émulation, Paris, 1824, tome ix. p. 76.⁸ Recklinghausen, Gould.⁹ Krebs, Friedreich, etc.

result of this pressure is seen in morbid alterations of the gland parenchyma. Through chronic interstitial growth and induration the entire gland structure, even to its last acinns, atrophies, loses its function, and is completely destroyed, or again is entirely replaced by adipose tissue.

The nature of the contents of pancreatic cysts varies so constantly that it would be impossible to embody in any one description all of the peculiarities met with. In some cases cysts were found filled with the altered secretion of the gland; in others, with a pure muens; again, with a serous fluid; but, in a large proportion, products of retrograde tissue metamorphosis, broken-down cells, cholesterin crystal, purulent matter, or blood extravasations, with crystals of hæmatoidin, were present.¹

Lastly, as has been already mentioned, calculous concretions are sometimes formed within old pancreatic cysts. Under the head of *Aene Pancreatica*, the contents of small cysts have been described at sufficient length in a former section.

The quantity of fluid present in a cyst will, of course, vary with its size; the largest amount of which we have record was between ten and fourteen ounces.

Many and varied are the changes induced in the surrounding tissues and organs by the presence of pancreatic cysts; in fact, the contents of both the epigastrie and hypochondriac areas may become more or less involved by the proximity of the diseased structures, and present the most remarkable variety of pathological processes. Those which most properly concern us are such as will, if accurately understood, be of use in enabling us to recognize during life the seat and nature of the disease. These lesions are, as a rule, simply the result of pressure, and will necessarily vary with the size and situation of the tumour. And, again, as an aneurism of the thoracic aorta, by pressing upon the trachea, without necessarily causing any alteration in its structure, will produce marked if not fatal symptoms; so a cyst of the pancreas, by mechanical pressure alone, will endanger if not end life. The changes which are ordinarily found consist, in the majority of cases, in the formation of morbid adhesions, from which the most singular distortions result. None of the contents of these regions escape implication. The portal vein,² inferior cava,³ and splenic vein;⁴ the pylorus,⁵ duodenum,⁶ colon,⁷ gall-bladder, and biliary passages;⁸ the stomach,⁹ liver,¹⁰ spleen,¹¹ and right kidney;¹² and, lastly, the solar plexus of nerves;¹³ may all be structurally involved or locally displaced, rendering diagnosis most difficult, and post-mortem examination most unsatisfactory.

¹ Pepper, *Centralblatt für die Med. Wissench.* 1871, p. 156.

² Dufresne, Recklinghausen.

⁴ Recklinghausen.

⁷ Fournier, Parsons.

¹⁰ Gould.

¹³ Recklinghausen.

³ Dufresne, Klebs.

⁶ Gould, Dufresne, Fournier.

⁹ Gould, Recklinghausen.

¹² Fournier.

¹¹ Recklinghausen.

In the positions occupied by cystic enlargements of the pancreas, there is not enough similarity to enable us to deduce any clinical laws. Thus the tumour may be situated below the right lobe of the liver, and between the intestines and the posterior wall of the abdomen,¹ at the entrance of the common duct into the duodenum,² between the left end of the stomach and the upper end of the spleen,³ midway in the pancreas,⁴ or in the left hypochondrium.⁵ Finally, with regard to their termination, large pancreatic cysts may rupture, their contents being discharged into the duodenum, stomach, or peritoneal cavity, and so cause death.⁶

Before closing our remarks upon cysts of the pancreas, the subject of hemorrhagic cysts is deserving of notice, and with it will be incorporated a short account of hemorrhages into the pancreas, for, owing to the close analogy which exists between these two conditions, it is thought desirable to discuss them together.

Old pancreatic cysts frequently contain more or less blood (generally disorganized, and of a chocolate-brown colour), which, if coagulated, constitutes the so-called hæmatoma.⁷ On the other hand, fresh, red extravasations are occasionally met with. It is necessary, in speaking of hemorrhage proper, to distinguish between that form which results from a passive congestion of the gland, dependent upon some central obstructive disease, along with chronic inflammatory changes in the vascular system,⁸ and hemorrhages which take place into the gland, the result of the rupture of vessels which have undergone a primary fatty degeneration.⁹ These constitute the so-called apoplectic hemorrhages into the pancreas. The second of these conditions is admirably illustrated by three cases, the report of which was published in a foreign journal a few years since.¹⁰ In the first the individual was apparently in perfect health; in the second, an epileptic, otherwise healthy; in the third, a drunkard. They were all quite corpulent. In each case death occurred suddenly, and without apparent cause, while after death extensive fatty degeneration of the pancreas was observed. The hemorrhage in one case was more of the nature of a bloody infiltration of the gland substance. In another the infiltration was also observed around the gland; while in the third there was a somewhat extensive hemorrhage into the pancreas. In two of these cases there was also an effusion of blood into the duodenum. Since the quantity of extravasated blood was in no case sufficiently large to bring

¹ Gould.² Dufresne.³ Clark.⁴ Recklinghausen.⁵ Parsons.⁶ Friedreich, Pepper, Klebs.⁷ Klebs, *Ann. med. Störk*, *Vin. Wien*, 1757, Gould, Duponchel, Clark, Pepper; Gros, *Archives Gén. de Méd.*, Paris, 1849, IVe série, vol. xix. p. 215.⁸ Friedreich, *Störk*; Rugg, *London Lancet*, May 18, 1850: Fatal Hemorrhage from Pancreas.⁹ Friedreich.¹⁰ Zenker, *Tagblatt der 47 Versammlung deutscher Naturforscher und Aerzte in Breslau*, 1874, s. 211.

about speedy dissolution from hemorrhage, *i. e.*, direct loss of blood; and since in each case great hyperæmia of the semilunar ganglion was noticed, without structural alteration in nerve cells or fibrillæ, the cause of instantaneous death is explained on the theory, that the suddenly enlarged pancreas, by pressure on the semilunar ganglion, and solar plexus of nerves, produced an immediate arrest of the heart, by a reflex inhibition exerted through the vagus nerve, as in Goltz's familiar experiment with the frog.

6. *Inflammatory Changes.*—Of those secondary conditions which are the result of the presence of calculi within the pancreas, duct dilatation and cyst formation are certainly the most interesting when viewed from a pathological standpoint; and, moreover, when excessive, by revealing to the diagnostician the presence of a local swelling, serve to explain many obscure and intractable symptoms. But, while acknowledging the greater interest of that part of our subject, it is necessary to enumerate at least the alterations of structure which result when the pancreas becomes the seat of stony concretions. These are in the main similar, when considered as mere pathological processes, to changes occurring in any other gland, and depend primarily upon inflammation. The pancreas may thus become the subject of acute, subacute, or chronic inflammatory processes; those which to us are of the greatest interest being the acute, suppurative, and the chronic interstitial inflammations. There is no doubt that the duct-wall first becomes the seat of change, and a condition is described in which it was found thickened, through an increase in the surrounding connective-tissue substance, its lining cells having undergone marked alterations.¹ No accurate description of duct inflammation resulting from the irritation produced by a calculus is, however, given by systematic writers. Dr. Roland G. Curtin, of Philadelphia, has reported a case of what he believes to have been a primary catarrhal inflammation of the ducts of the pancreas.² The microscopic examination of the specimen showed a condition of things not very dissimilar to the description just given. Dr. Curtin suggests, however, that the inflammatory process may have begun in the duodenum, and from thence involved the pancreatic duct secondarily, this theory being borne out by the fact that during life symptoms of intestinal derangement preceded any evidences of pancreatic obstruction. Whether a primary catarrhal inflammation of the pancreatic ducts is possible, must of course remain an open question; but that such an inflammation, whether primary or secondary, will give rise to subsequent changes in the pancreas, should it affect the duodenal end of the duct of Wirsung

¹ Cornil and Ranvier, *loc. cit.*

² A Contribution to the Pathology and Therapeutics of the Pancreas. A paper read before the Pennsylvania State Medical Society, 1881, by Dr. Roland G. Curtin, of Philadelphia.

alone, or be confined to the smaller branch ducts, is a fact proven by the case of Dr. Curtin, and by the results recorded by other investigators.

It is possible, though of rare occurrence, to have an inflammation accompanied by deposits of purulent matter in the gland structure. We have been able to collect but three cases in which this condition was the result of the presence of calculi. In one, the head of the pancreas was merely touched with points of ulceration;¹ in a second, an abscess of the size of a nut, containing much purulent matter and many calculi, was found in the centre of the gland;² while in a third, a very large abscess, containing calculi, and having for its walls the dilated head of the gland, was discovered.³ Such abscesses may open in any direction; the second referred to discharged a part of its contents into the stomach through a hole the size of a thumb.

A chronic interstitial inflammation of the pancreas is described, which by hyperplasia of connective tissue may lead to hypertrophy, atrophy, induration, and fatty degeneration. The condition of hypertrophic cirrhosis is rare. Atrophic cirrhosis is common, and the induration accompanying it is marked. This induration, which may give to the gland a feeling of cartilaginous hardness, has very often been confounded with scirrhus, so that in many cases of supposed cancerous disease, there is no doubt that the real lesion was one of cartilaginous induration.⁴

a. Fatty Changes.—In speaking of fatty disease of the pancreas, a distinction must be drawn between the condition known as lipomatosis and the true fatty degeneration, or *transformation graisseuse*. In the first of these, fat develops in the interacinous connective tissue, or else on the periphery of the gland, pushes its way in, and produces atrophy and even complete destruction of its proper secreting structure, the whole gland being converted into a mass of fat.⁵ The second is a true fatty metamorphosis, beginning in the gland cells, and leading to complete destruction of the acini and subsequent atrophy of the whole viscus.⁶ These two conditions are to a certain extent inseparable, and since no microscopic examination was made, it is impossible to say whether, in the two reported cases of pancreatic calculi in which fatty changes in the gland were the result, fatty infiltration or fatty degeneration existed alone or together.⁷

¹ Dufrèsne.² Muhlbauer.³ Fournier.⁴ Cawley, Salmade, Schupman, Friedreich, and Klebs.⁵ Maier, *Archiv der Heilkunde*, Leipzig, 1865; Fall von ausgezeichnete (r) Verfestigung der Pankreas, s. 168.....Klebs, op. cit. s. 592.....Friedreich, op. cit. p. 624.Cornil et Ranvier, op. cit. tome ii. p. 970: *Dégénérescence graisseuse*.....Bécourt, op. cit. p. 50.⁶ Jones, *Med.-Chirurg. Trans.*, London, 1855: Observations respecting Degeneration of the Pancreas, p. 195.....Salter, *Encyclopædia of Anatomy and Physiology*, Part XLIV.....Rokitansky, *Lehrbuch der Patholog. Anat.*, 1861, iii. s. 313, 369.....Bécourt, op. cit. p. 50.....Ancelet, op. cit. p. 29.....Bock, *Lehrbuch der Pathol. Anat.*, Leipzig, 1847: Pankreas, § 7, s. 669.....Cruveilhier, loc. cit.⁷ Clark, loc. cit., Recklinghausen, op. cit. 16.

II. SYMPTOMATOLOGY.

In endeavouring to inform ourselves with regard to the symptomatology of calculous disease of the pancreas, the same difficulties are encountered as beset our studies of its pathological anatomy. The older writers are as obscure in their description, and brief in their enumeration of symptoms, as they are obscure and brief when pathological conditions were to be described or enumerated. And more, in modern times, instances of calculous disease of this gland are rather regarded as curiosities to be alluded to by a pathological anatomist, than as subjects worthy the study of a clinician. And considering, as we must, the great number and variety of those diseases with which the active practitioner daily comes in contact, and which still remain so intractable to all therapeutic resource, we can well understand how a condition, relatively so rare as calculous disease of the pancreas, a condition about which we can learn so little from literature, either past or contemporary, whose history and causation are so obscure, whose diagnosis is so difficult, and whose treatment is so ineffectual, should fail to receive more than superficial study, or passing mention. Therefore, when, as here, we leave aside the study of the lesion, its causation, and its treatment, and confine ourselves solely to those signs and symptoms which would lead us to infer its presence, we cannot hope to find anything so characteristic as is revealed by the physical exploration of the chest, or the temperature curve of a fever.

The pancreas, it is true, plays a most important part in the great act of digestion, but when, by disease, its functions are perverted or destroyed, so intimate are both its structure and functional connection with the other members of the same great system, and so great may be its pathological alterations, without there being any tangible evidence of the same, that from the start our diagnosis becomes most difficult. But even should disease be located in the pancreas, it would be almost, if not completely impossible, to differentiate, for example, between cancerous and calculous disease of that organ. It will be our endeavour, in the following pages, to make, from a study of the cases at our command, a complete, but we fear an unsatisfactory recapitulation of the various views advanced from time to time upon the symptomatology of this disease, and to give due weight to such as seem to us of the greatest clinical importance, both in pure, uncomplicated cases of pancreatic calculi, and in those accompanied by disease of other organs and tissues.

It is most important, while endeavouring to explain the symptoms of calculous disease of the pancreatic ducts from a pathological standpoint, to remember two things, already briefly referred to, namely, the anatomical position and local relations of the pancreas, and its physiological function as a most important digestive organ. Deep-seated and surrounded as it is by structures whose organic and functional integrity is of such importance to the well-being of the economy, it is easy to see how, for

example, from mere enlargement, by mechanical pressure, it could cause changes and disturbances the most grave. In one case, a pancreas, three times its normal size, and filled with concretions, so pressed upon the aorta as to produce an enormous aneurismal dilatation of that vessel above the point of obstruction.¹ In another, the return flow of blood through the inferior vena was interfered with to such an extent as to cause ascites with œdema of both legs.²

In a third, where the spleen was found much softened and disintegrated, in default of a more suitable explanation, the lesion is attributed to compression of the splenic artery and veins by the enlarged, earthy, and indurated pancreas;³ while, from pressure upon the excretory ducts of the liver, we find jaundice from retention, a condition by no means uncommon.⁴ When we consider, finally, the local relation between the pancreas and the celiac plexus of nerves, we find ourselves entering upon a branch of our subject the most interesting.

In a large number of the reported cases of pancreatic calculi, *pain* is mentioned as one of the most constant, and, at the same time, one of the most annoying of symptoms. But it is not one kind of pain only that we find described, but rather two, differing essentially in character one from the other, and having, in most cases, two entirely distinct modes of causation. The one dull, heavy, a sense of weight, a sense of uneasiness, located in the epigastrium, lasting, in some cases, throughout the entire attack,⁵ while, in others, it preceded the actual illness of the patient by many years.⁶ The other, sharp, severe, sudden in its onset, irregular in its accession, spontaneously relieved, yet reoccurring when least expected.⁷ Separately or together these two kinds of pain, in different degrees of severity, occur very often in cases of calculous disease, and, in seeking for their mode of causation, two conditions are, we think, necessary to afford a satisfactory explanation. The various sensations at first referred to, varying in degree from a feeling of uneasiness or of weight, to pain, generally constant, and, in some instances, quite severe, are due, it would appear, to the pressure of a hard and enlarged pancreas upon the celiac plexus of nerves. Although it would seem, at first sight, as if the mere presence of calculi within the pancreas would be quite suffi-

¹ Salma, loc. cit. Portal, loc. cit. Dufrèsne, loc. cit.

² Dufrèsne, quoting Portal's second case, see *Maladie du foie*, obs. f, p. 300. Clark, loc. cit. Muhlbauser, loc. cit., noticed œdema of extremities of left side only.

³ Wilson, loc. cit.

⁴ Meckel, loc. cit. Fournier, loc. cit. Dufrèsne, *ibid.* Gould, op. cit. § 576. Henry, loc. cit. Friedreich, op. cit. p. 618. Galiati, loc. cit.

⁵ Mercklin, loc. cit. Wilson, loc. cit. Clayton, loc. cit. Muhlbauser, loc. cit. Fournier, loc. cit. Henry, loc. cit. Gould, op. cit. § 576. Elliotson, *Med.-Chirurg. Trans.*, loc. cit.

⁶ Mercklin, *ibid.* Gould, *ibid.* Henry, *ibid.* Galiati, *ibid.* Pepper, *Medical Ward Notes*, Hospital of the Univ. of Pa., 1880.

⁷ Schupmann, loc. cit. Wilson, loc. cit. Gould, loc. cit. Clayton, loc. cit. Dufrèsne, loc. cit. Clark, loc. cit. Fournier, loc. cit. Pepper, loc. cit.

cient to account for these subjective symptoms, yet, as it has been remarked, the relative insensibility of the excretory ducts of this gland, as compared with those of the liver or kidney, renders it improbable that much inconvenience or pain would be caused, even though they were distended by calculous concretions.¹ Whereas, if the cœliac plexus could be so compressed (under circumstances such as we have above described) as to suffer atrophy, and even complete destruction of its ganglionic cells,² it seems very probable that this, or even a far less degree of pressure, would produce pain. Our explanation is further borne out by the fact, that, when the recumbent posture is assumed, the pain grows worse,³ while occasionally it radiates to the back, chest, and even right shoulder.⁴ We are, therefore, led to conclude that this symptom, pain, is the result of pressure, and may, as has been suggested, be called a cœliac neuralgia.⁵

But when we come to consider the other kind of pain described, another and more suitable explanation offers itself. This, the true pancreatic colic, the result of the rapid distension of the duct of the gland by a stone forcing its way into the duodenum, the walls of the duct spasmodically contracting upon it, has been referred to in a former section. From a diagnostic point of view this symptom has but little weight, for it is difficult to tell, from the character or location of the pain, whether a biliary or a pancreatic calculus is being passed; as a pancreatic calculus, in its passage through the last part of the duct of Wirsung, by pressure on the common duct, would produce jaundice as effectually as would one of biliary origin.⁶

Before leaving this part of our subject, it is well to refer briefly to the existence of *mellituria*, as a symptom of calculous disease of the pancreas, since it occurs with sufficient frequency to demand attention.⁷ In so much obscurity is the morbid anatomy of diabetes mellitus involved, that it would be alike useless and impossible, within the limits of this paper, to go at length into the theories that have been advanced as to its causation. Suffice it to say that, whereas, in each and every organ of the body, the morbid change, of which the condition known as mellituria is the result, has been from time to time located, it seems highly improper that the pancreas, as one of the organs of importance, should not bear its part of the burden. In one of two⁸ cases of calculous disease (where, during life, mellituria was present), in which a careful examination of the cœliac plexus of nerves was made after death, changes consist-

¹ Gross, loc. cit. Bigsby, loc. cit.

² Klebs, op. cit. s. 544.

³ Wilson, loc. cit. Gould, op. cit. § 576.

⁴ Elliotson, Med. Ch. Trans., loc. cit. Fournier, loc. cit. Pepper, Med. Ward Notes, Univ. Hosp., loc. cit.

⁵ Klebs, op. cit. s. 544.

⁶ Friedreich, op. cit. p. 618.

⁷ Recklinghausen, op. cit. I. a. and b. Elliotson, Med. Chirurg. Trans., loc. cit. Cawley, loc. cit. Klebs, op. cit. s. 544. Chopart, Maladies des voies urinaires. Cf. Klebs, loc. cit. Pepper, Med. Ward Notes, Univ. Hosp., loc. cit.

⁸ Klebs, op. cit. s. 544. Recklinghausen, loc. cit.

ing in the destruction of a certain number of its ganglionic cells could be observed. Now, since it is affirmed that extirpation or atrophy of the cœliac plexus will give rise to the presence of sugar in the urine,¹ it is plain how secondary changes in this plexus of nerves of sufficient gravity to bring about this condition, could be produced by the pressure of a pancreas, made large and hard by the presence of calculi. And, to go further, atrophy of the pancreas will follow these changes in the cœliac plexus as atrophy of the submaxillary gland will follow section of the vaso-motor nerves supplying it. The appearance of fatty stools after mellituria would seem to prove this.² There is no doubt at least that atrophy of the cœliac plexus will produce a vaso-motor paralysis throughout the whole area occupied by the pancreas, for all the vessels have been seen enormously dilated, and the spleen engorged and swollen.³

In regard to those symptoms which are the result of an improper performance of the physiological functions of the gland, due to the presence of calculi within it, we can only enumerate, without endeavouring to explain, the phenomena mentioned in the reported cases. When the main excretory duct of the pancreas was entirely blocked up by concretions, the symptoms of digestive derangement were of course more marked than when the outflow of the pancreatic juice was in whole, or in part, permitted. In thirteen cases, we find the actual illness of the patient preceded for a variable length of time, and ushered in by more or less marked symptoms of gastro-intestinal derangement, accompanied in some cases by abdominal pain. During the progress of the disease, these symptoms become more persistent, and increased in severity, so that, in many cases, the termination of the organic disease in complete duct obstruction placed a limit to the patient's life, while, as has been remarked, we find changes in other parts of the body capable of spoiling life, but not of causing death.

In four cases, where, upon post-mortem examination, calculi were found in the pancreas, *vomiting* was one of the most distressing symptoms present during life.⁴ In three others, bloody vomiting was noticed.⁵ In six cases, *diarrhœa* was present;⁶ in four, *melæna*;⁷ while *constipation* was observed in six,⁸ and fatty stools in three.⁹

The presence of fat in the stools is a symptom of great importance in the recognition of pancreatic disease,¹⁰ but that it is not of absolute diag-

¹ Klebs, op. cit. s. 544.

² Flcs, cf. Klebs, op. cit. s. 544.

³ Klebs, loc. cit.

⁴ Cases reported by De Graaf, Mercklin, Galiati, and Schupmann.

⁵ Wilson, Gould, Clayton.

⁶ DeGraaf, Gould, Dufrèsne, Henry, McCready, Janeway.

⁷ DeGraaf, Elliotson, Gould (two cases).

⁸ Galiati, Cawley, Schupmann, Wilson, Clark, Wm. Pepper.

⁹ Elliotson, Gould, Clark.

¹⁰ This subject will be found discussed at length in the Medico-Chirurgical Trans., London, 1832, vol. xviii. p. 76, and elsewhere in the same volume by Lloyd & Bright.

nostic value is proven by the well-known fact, that the same condition will follow upon the obstruction of the biliary passages. For, while the main action of the pancreatic juice upon fats is to cause their emulsification, this power is possessed, though to a less extent, by the bile, which, like the *succus entericus*, emulsifies fat, but does so to a degree entirely insufficient to meet the needs of the economy. Therefore, it must be remembered that not the bile alone, nor the pancreatic juice alone, can properly digest fats, but rather that they must act together, mutually aiding one another in the performance of this joint function. But since, as an emulsifying agent, the pancreatic juice is far more active than the bile, it might be argued that fatty stools would be more symptomatic of pancreatic than of hepatic disease. But, even should jaundice and fatty stools *both* be present in the same case, it by no means follows that they together point to biliary obstruction, for, as has been shown, a pancreatic calculus, lodged in the duct of *Wirsung* just as it enters the duodenum, may, by pressure on the common duct, prevent the escape of bile, and give rise to jaundice, while, at the same time, by this obstruction, but more by preventing the outflow of the pancreatic juice, cause the appearance of fat in the excreta. In proof of the first of these assertions, it may be said that in two instances of calculous disease in which the excreta presented a pale or clay-coloured appearance, upon post-mortem examination, no morbid alteration of sufficient gravity to cause this condition was found in the liver, and the dilated ducts contained no obstruction, the common duct opening freely into the duodenum, while the pancreatic duct was impervious, being blocked up with calculi.¹

It is strange that the presence of fat is noted in so few cases of this pancreatic disease, and, since the condition is one of some rarity, we will append an abstract of the three cases in which it was observed.

CASE I.² H. M., æt. 57; derangement of digestion for some years; fat noticed in urine, one month later also in excreta. In a short time fat oozed away from lower bowel without intermission or volition. Pain, progressive emaciation, and death from exhaustion. *Autopsy*: Liver congested, ducts dilated but healthy. Pancreatic duct at duodenal end completely blocked up by a mass of calculous matter.

CASE II.³ W. P., æt. 45, had pain, diarrhœa, melæna; blood disappeared from, and fat appeared in stools and urine; amount of fat and severity of pain diminished as death approached; sugar appeared in urine; exhaustion, death. *Autopsy*: Liver, gall-bladder, and bile-ducts sound. Pancreatic duct and its larger branches crammed with calculi.

CASE III.⁴ Man, æt. 40, had several attacks of hemorrhage from bowels; diarrhœa and constipation alternated; tenderness in epigastrium, pain; fat in stools (apparently only after articles containing fat had been eaten); no fat in urine; jaundice; death in coma. *Autopsy*: Liver rather small and dark-coloured; ducts dilated, contained no obstruction, free opening into common duct. Pancreatic duct obliterated at duodenal end.

¹ Gould, op. cit. § 576..... Clark, loc. cit.

² Clark.

³ Elliotson, Med.-Chir. Trans., loc. cit.

⁴ Gould, § 576.

There have been discussed up to this point the symptoms which may be considered most characteristic of calculous disease of the pancreas, but there are certain others mentioned which it may be well to refer to. The appetite, "inordinate,"¹ "craving,"² "ravenous,"³ especially in those cases where large quantities of fat passed away undigested, has been said to be impaired, tending in some cases toward complete anorexia.⁴ As a natural result of the crippled condition of the nutritive processes, progressive emaciation,⁵ accompanied by debility,⁶ and followed by extreme prostration and exhaustion, would be expected.⁷ Nothing worthy of comment is to be noticed with regard to the circulatory, respiratory, or nervous systems; whatever derangement we find mentioned can all be explained by the presence of other lesions, complicating the pancreatic disease. A most interesting condition is met with when we come to consider changes present in the urine. It will be seen, in the three cases already recorded, in which fat was found in the stools, that in two, fat passed away with the urinary secretion, and indeed, in one, made its appearance one month before it was detected in the excreta, and in such quantity as to float, when cool, in greasy cakes upon the surface.⁸ Lastly, a peculiar colour of the skin, which is believed by some to be pathognomonic of pancreatic disease, must be mentioned, in connection with three cases of calculous affection in which it was observed. In them the appearance presented is variously described as being unhealthy, pale-yellow, dirty or earthy, and seems, except in one case, in which it was confined to the face, to have been general.

The ordinary methods of physical examination offer some partial assistance in the recognition of calculous disease of the pancreas. By palpation it is most difficult to recognize the position of this organ in health. "By deeply depressing the abdominal walls about a hand's-breadth below the umbilicus, by then rolling the subjacent parts under the hand (the stomach and colon must be empty), it might be possible to detect it in an individual who is thin and whose tissues are lax."⁹ In a case where the size of the pancreas is only slightly increased by the presence of calculi, on careful palpation, it might be possible to detect a feeling of resistance, although when the gland is markedly enlarged, as in one of the reported cases of this affection (by an enormous stone formation situated in its tail, and the presence of a scirrhus at its head), a tumour of cartilaginous hardness might be perceived after careful examination of the abdomen. In the case referred to, the tumour was flat, slightly movable, and sensitive to the touch.¹⁰ This is the only instance of this affection in which a

¹ Clark.² Gould.³ Wm. Pepper.⁴ Schupmann,.....Fournier.⁵ Clayton, Clark, Wm. Pepper.⁶ De Graaf, Dufrèsne, Clark.⁷ Fournier.⁸ Clark, Wilson, Henry, Janeway.⁹ Sir Wm. Jenner, British Med. Journal, Jan. 16, 1869, p. 42.¹⁰ Schupmann.

local examination was made, except in three instances where a large cyst was the result of duct obstruction,¹ and in a fourth, where an enormous abscess, situated in the head of the gland and filled with calculi, caused the appearance of a localized epigastric swelling.² The diagnosis of abdominal tumours, as is well known, is extremely difficult, and is not a subject which it is our intention to discuss. To distinguish such a condition as we first described from a scirrhus involving the pyloric end of the stomach, or an induration of the left lobe of the liver, would, by physical exploration alone, be most difficult; while the characteristic thrill and bruit of an aneurism might be simulated by the rush of blood through an abdominal aorta compressed by an enlarged pancreas.³ And so it is with cysts of this viscus, which can only be recognized by their situation, deep in the region of the pancreas, their round or oval shape, smooth surface, and the sense of fluctuation imparted to the touch,⁴ while in both these conditions the general symptoms, which have been mentioned as more or less characteristic of calculous disease, would be of aid in determining upon a diagnosis.

III. DURATION AND TERMINATION.

No decided laws can be laid down with regard to the duration and termination of this affection. So rare is it to find a pure uncomplicated case of calculous disease, that any generalization would be impossible; nevertheless, taking all those cases in which both clinical history and post-mortem examination are recorded, we find death from exhaustion or asthenia one of the most frequent of all terminations. In four cases, diabetes was the cause of death;⁵ in one, rupture of an aneurism produced by the disease itself;⁶ in another, internal hemorrhage, consequent upon a laceration of the pancreas, the calculus escaping into the peritoneal cavity.⁷ Pneumonia is referred to in one case as hastening the fatal issue,⁸ while aortic disease,⁹ an accident of pregnancy,¹⁰ and albuminuria and phlebitis¹¹ are each mentioned as having placed a limit to life.

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¹ Gould, § 576.....Dufresne, quoting Portal's 2d case.

² Fournier.

³ The diagnosis in such a case might be assisted, as suggested by Prof. Wm. Pepper, by placing the individual in the genu-pectoral position, and then using the method of palpation.

⁴ Friedreich, Cysts, op. cit. p. 615.

⁵ Cawley, Elliotson, Recklinghausen.

⁶ Salmade.

⁷ Clayton.

⁸ Janeway.

⁹ Curnow.

¹⁰ Schmitt.

¹¹ McCready.

Sandifort, Obs. anat. patholog., Lugd. Batav., 1777, lib. iii. cap. iv. p. 73. *Cawley*, London Medical Journal, London, 1788, vol. ix. part iv. p. 286. *Salma*, Recueil périodique de la soc. de méd. de Paris, 1797-1798, tome iii. p. 451. *Portal*, Cours d'anat. méd., Paris, 1803, tome v. p. 356. *Schmitt*, Zweifelhafte Schwanger, Wien, 1818. *Muhlbauer*, Neue Notizen (von Froriep), Weimer, 1822-1847. *Duponchel*, Soc. méd. d'Émulat., 1824, t. ix. p. 76. *Gendrin*, Histoire anat. des inflam., Paris, 1826, tome ii. p. 263. *Leeannan*, Journ. de pharm. et de chim., Décembre, 1827, p. 626. *Pemberton*, On Various Diseases of the Abdominal Viscera, Richmoud, Va., 1830, chap. iv. p. 64. *Bécourt*, Recherches sur le Pancréas, Thèse, Strasbourg, 1830, § 5, p. 69. *Baillie*, The Morbid Anatomy of the Human Body, London, 1812, p. 115, and 1833, p. 222. *Bigsby*, Edinburgh Medical Journal, 1835, vol. xlv. p. 97. *Mondière*, Archiv. gén. de méd., II série, Paris, 1836, t. xii. p. 147. *Schupmann*, Hufeland's Journal, 1841, xxi. Bd. § iii. s. 41. *Engel*, Oesterreich med. Jahrbücher, 1841, xxiii. u. xxiv. Bd. *Wilson*, Med. Chirurg. Trans., London, 1842, vol. xxv. p. 42. *Devilliers*, Revue médicale, no. de Décembre, Paris, 1844, t. iii. p. 576. *Gross*, Pathological Anatomy, Phila., 1845, p. 689. *Gould*, Catalogue of the Anatomical Museum of Boston Society for Medical Improvement, Boston, 1847, §§ 575, 576, p. 173. *Schulze*, Journal für der Chemie, xxxix. p. 29. *Rokitansky*, Manual of Pathological Anatomy, Syd. Soc. London, 1849, vol. ii. § 2, p. 180; and Lehrbuch der Pathol. Anat., 1861, iii. s. 313, 369. *Clayton*, The Medical Times, London, 1849, vol. xx. p. 37. *Clark*, London Lancet, Aug. 15, 1851. *Dufrèsne*, Traité de l'affection calculeuse du foie et du pancréas, Paris, 1851, Article deuxième, p. 494. *Virchow*, Verhand. der med. physik. Gesellschaft zu Würzburg, 1852, II. Bd. s. 53 u. III. Bd. s. 368. *Virchow*, Die krankhaften Geschwülste, Berlin, 1863, I. Bd. s. 276. *Jones & Sieveking*, A Manual of Pathological Anatomy, Phila., 1854, p. 532. *Henry*, Journ. de chim. méd., IV. série, Paris, 1855, t. i. p. 273, et La France méd. et pharm., 3 année, Paris, 1856, No. vi. p. 42. *Jones*, Med.-Chirurg. Trans., London, 1855, p. 195. *Cruveilhier*, Traité d'anat. pathol. gén., Paris, 1856, t. iii. p. 365. *Ancelet*, Essai analytique sur l'anatomie pathologique du pancréas, Thèse, Paris, 1856, t. i. p. 26. *McCready*, New York Medical Journal, 1856, p. 78. *Hoppe*, Virchow's Archiv, 1857, xi. Bd. s. 96. *Parsons*, British Medical Journal, June 6, 1857, p. 475. *Recklinghausen*, Virchow's Archiv, Berlin, 1864, 30 Bd. s. 360. *Ancelet*, Études sur les maladies du pancréas, Paris, 1864. *Maier*, Archiv der Heilkunde, Leipsig, 1865, s. 168. *Jenner*, British Medical Journal, Jan. 16, 1869, p. 42. *Cornil et Ranvier*, D'Histologie pathologique, Paris, 1869-1873, tome ii. p. 974. *Pepper*, Centralblatt für die med. Wissensch., 1871, p. 156. *DeLafeld*, Handbook of Post-mortem Examinations and of Morbid Anatomy, New York, 1872, p. 203. *Janevay*, New York Medical Record, 1872, vol. vii. p. 357. *Curnow*, Trans. Pathol. Soc., London, 1873, vol. xxiv. p. 136. *Zenker*, Tagblatt der 47. Versam. deutsch. Natur. u. Aerzte in Breslau, 1874, s. 211. *Schmidt*, Annäl. de. Chem. u. Pharm., 1854, xxi. p. 33. *Wilkes & Moxon*, Lectures on Pathological Anatomy, Phila., 1875, p. 470. *Flint*, Text-book of Human Physiology, New York, 1876, p. 272. *Klebs*, Handbuch der Patholog. Anat., Berlin, 1876, I. Bd. s. 544 u. 547. *Carpenter*, Physiology, Phila., 1876. *Friedreich*, Ziemssen's Cyclopedia of Medicine, New York, 1878, vol. viii. pp. 615-618. *Cornil and Ranvier*, Manual of Pathological Histology, Translation, Phila., 1880, p. 581. *Foster*, Text-book of Physiology, American edition, Phila., 1880, p. 333. *Wm. Pepper*, Medical Ward Notes, 1880, Hospital of the University of Pennsylvania.

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ARTICLE VI.

CLASSIFICATION OF THE "PORRO (?) OPERATIONS." WHAT IS A TRUE PORRO-CÆSAREAN OPERATION, AND WHAT OTHER FORMS OF UTERINE ABLATION IN PREGNANT WOMEN HAVE BEEN ERRONEOUSLY CALLED "PORRO," AND SHOULD BE SEPARATELY CLASSIFIED. By ROBERT P. HARRIS, A.M., M.D., of Philadelphia.

SEVEN years have passed since Prof. Porro, then of Pavia, and now of Milan, instituted the modification of the old Cæsarean operation which bears his name, designing thereby, if possible, to diminish the great mortality of the mothers whose deformed or obstructed pelvises required that they should be delivered by abdominal incision, and especially in the large maternity hospitals of Europe, in which but very few of the subjects escaped death. In fact, so great was the maternal mortality that, in some of the large cities, as Paris and Vienna, a fatal result was universal. The *classic* method, as it has been called under a misconception of its age, was intended to save two lives wherever possible, and to avoid the destruction of the fœtus. By this old operation, whose age cannot be established beyond four centuries back from any reliable evidence, the child was readily saved, where it was performed in due season, but, as this was rarely done, a large proportion perished, from having been too long subjected to uterine pressure.

The title given by Prof. Porro to his method, viz., "*Utero-ovarian amputation as complete of the Cæsarean operation*," conveys an idea of its true character. The old operation is to be first performed, the fœtus removed, and the uterus made to contract; then the plan is radically changed; the uterus is drawn through the abdominal wound; its neck is ligated by a wire constrictor tightened by screw-power; the organ is cut away above the loop, and the stump is secured in the lower angle of the abdominal wound. The design of this change is to avoid the possibility of the escape of *post-partum* uterine fluids into the abdominal cavity, and the dangers consequent thereupon, by converting the uterine wound, with its disposition to gape open, into an open stump, external to the body, and discharging externally under antiseptic dressings. This method also possesses the additional advantage, that it may be performed prior to labour, thus avoiding the exhaustion consequent upon this painful effort of nature. Many operations have been performed before the maturity of gestation, and many after labour had progressed for a short or long period. And it is very evident that, as in the old operation, the result will depend very much upon *the condition of the woman at the time of its performance*; if such as to make the prognosis favourable, a large proportion will recover.

Although Prof. Porro is entitled to the credit of having performed the first successful puerperal utero-ovarian amputation, and I think also of

having the method bear his name, we are to remember that an unsuccessful operation of a very similar nature was performed in this country in 1869, by Prof. Storer, then of Boston, now of Newport, R. I. As the latter failed in saving the life of the mother, there was no repetition of his method in the seven years which elapsed between his case and that of Prof. Porro. Had he succeeded, under the circumstances of extremity, which compelled him to clamp and remove the uterus, it is not likely that he would have had imitators in the sense that Porro has had, after an elective operation, based upon a theory, obtained from the success of experiments tried upon the lower animals, and again tried on the human female with a similar result, the case being one of ordinary rachitic obstruction of the pelvis.

1. *Müller's Modification*.—In the first eight Porro-Cæsarean operations, covering a period of twenty months, the original plan was adhered to, with a loss of six women, all of the children having been saved but one. A woman then came under the care of Prof. Müller, of Bern, whose condition was such as to induce him to modify the method of Porro, hoping thereby to escape the dangers of hemorrhage, and the risks from having blood and noxious fluids pass into the abdominal cavity during the operation. This patient was the subject of malacosteon; had been $3\frac{1}{2}$ days in labour; was in a febrile condition, and presented indications of septic endo-metritis, with gas in the uterine cavity as an evidence of decomposition of the fœtus. To secure her against the dangers mentioned, Prof. Müller made a long incision in the abdomen, drew out the uterus, carefully protected the abdominal cavity against the entrance of fluid, put on the wire constrictor and secured it, opened the uterus and removed its putrid contents, and, finally, secured the stump as in the original Porro operation. The patient recovered. The success of Müller, and a belief in the value of his method, caused many to imitate him, and although unsuccessful for a time, such has been the general result that it has now a number of advocates. It has not met with much favour in Italy, but has been repeatedly preferred in Austria and Germany. The chief objections to the method, are the long incision and the danger of losing the fœtus from asphyxia. This risk of loss is more apparent than real, if the uterus is rapidly evacuated after its constriction; but in a recent case under Prof. Carl Braun, of Vienna, the fœtus could not be resuscitated, owing to a little delay at this point of the operation. Having seen two narrow escapes under the method, I believe this to be one of the dangers to be especially guarded against.

2. The "*Esmarch bloodless operation*" has been used in combination with the two preceding methods. It was first tested by Prof. Litzmann, of Kiel, a colleague of Esmarch, on June 14, 1878, and proved fatal from septic peritonitis on the sixth day, not from any defect in the process, but from an unfortunate occlusion of the os uteri, which prevented the escape

of fetid pus that collected after the operation in the cervical canal. This combination of the Porro, Müller, and Esmarch methods has recently been revived with success in three consecutive cases by Prof. Carl Braun, of Vienna. After the uterus is turned out, the elastic tube is made to surround the cervix tightly, before the incision is made, so that there shall be no loss of blood beyond what already exists in the vessels of the organ. This has been found of special advantage in cases where the placenta is located under the line of incision. In addition to the elastic tubing, the constricting wire is to be passed around the cervix and held in readiness for tightening, when the former is to be removed. If the Esmarch tubing is not hurriedly applied, and the fœtus quickly liberated, it will be lost.

3. *Ligating and Dropping in the Stump.*—Under the impression that the cut cervix should and could be treated as a pedicle, several operators have boldly tied it and dropped it in. It was first tried by Prof. Gustav Veit, of Bonn (March 21, 1880), but with a fatal result. Wasseige amputated the cervix by double flap and stitched the two halves together after the process of Schroeder, but lost his patient. Prof. Gustav Braun pocketed and stitched up the stump in two instances, but both patients died. Prof. Isaac E. Taylor, of New York, saved his case so far as the danger from the dropped cervix was concerned, but lost her in twenty-six days, from her own perversity in sitting up when he had warned her against the danger.¹ The fact that Prof. Veit, in a second operation (Sept. 18, 1880), and Dr. Kabierski, of Breslau (Jan. 15, 1883), did succeed in saving each a patient in whom they dropped in the stump, only shows that the method is not necessarily fatal; but this need not encourage others to imitate them. It is much to be regretted that this method is so dangerous, as otherwise it would have several advantages over the original Porro plan, which often makes an ugly drawn cicatrix, and interferes more or less with the dilatation of the bladder.

4. *Non-Cæsarean Utero-abdominal Amputations.*—When a uterus containing a fœtus of four, five, or six months is removed, with perhaps a large fibro-myoma, or mass of fibroid tumours, without the viscus being opened at any stage of the operation, what propriety is there in denominating the ablation a Porro operation? Prof. Wasseige, on March 18, 1880, operated upon a woman nearly five months pregnant, who was affected with a large cystic fibro-myoma. He did not open the uterus, neither did he secure the stump as recommended by Porro. It was not a Cæsarean section at all, and yet it, and several others quite similar to it, have been placed in the list of Porro-Cæsarean operations. The fœtus not being viable in these cases, there was no Cæsarean delivery as a first stage; and the second might with as much propriety be named after Schroeder or Péan, according to the method used, as after Porro, whose process is

¹ She had at the time a double phlegmasia dolens, and died of cardiac thrombosis.

simply a mode of concluding the old Cæsarean section. Several of such cases it is true have recovered, but this does not alter the position I now take, in claiming that they should be placed in a different classification from those of the true Porro type.

5. A still different manner of operating was pursued by Dr. Leon Oppenheimer, of Wurzburg, on July 4, 1880. The patient was 43 years of age, the subject of malacosteon, and pregnant for the fourteenth time. Intending to perform an ordinary Müller operation, he turned out the uterus by a long incision, but finding its walls as he thought dangerously thinned, feared to make pressure upon the cervix; he therefore performed an extra-abdominal hysterotomy, delivered the fœtus, left the placenta *in situ*, kneaded down the uterus, and when it was well contracted, applied the clamp of Mr. Spenceer Wells, cut away the viscus, and cauterized the stump with a thermo-cautery. This operation took place in a private house, before labour commenced, and both mother and child were saved.

This case reminds me of an operation which was performed in this city on March 5, 1883, at the Woman's Hospital, by Dr. Anna E. Broomall, assisted by Dr. Albert H. Smith, the consulting accoucheur. Desiring to avoid hemorrhage, Dr. Broomall turned out the entire uterus; Dr. Smith then grasped the cervix so as to control its circulation, whilst she opened the organ and delivered the fœtus, he retaining his hold until the uterus was well contracted, when it was returned into the abdominal cavity, its wound sutured, and that of the abdomen closed and dressed. Very little blood was lost during the operation, which was not an original one, except in the substitution of the hand for the elastic tube of Es-march. The patient of Dr. Broomall, having been exhausted by a labour of thirty-six hours, died of septic peritonitis in thirty-six hours, a frequent sequel of wounding a uterus after it has been long under the effect of muscular action. The cause of difficulty was a pelvic deformity, the conjugate diameter of the superior strait measuring two and seven-tenths inches.

6. Strange as it will appear, after a careful examination of the subject, statistical collectors still insist in calling a hysterectomy performed after a laparotomy following a rupture of the uterus a "Porro operation." As there is no Cæsarean section here, there is certainly no propriety in the title given. The method originated with Dr. Oscar Prévôt, of Moscow, who first performed it, and is entitled to have it called after him, although there is as yet little honour to be gained from it, as the six cases thus treated have died. Far better results have been obtained in the United States, by either leaving the uterus intact, after removing the fœtus and cleansing the abdominal cavity, or by taking the additional precaution to stitch up the uterine rent.

By a careful examination of the several forms of uterine ablation called by the name of "*Porro*," we will find the following in order:—

1. The true Porro-Cæsarean Section, with the stump of the cervix secured in the abdominal wound, as directed by its originator.
2. The Porro-Müller Cæsarean Section, with the stump as above.
3. The Porro-Müller Cæsarean Section, the uterus being opened with Paquelin's thermo-cautery knife (Chiara of Milan).
4. The Porro-Müller Cæsarean Section, the constriction being made after the plan of Esmarch, and the stump secured as above.
5. The Porro-Cæsarean Section, with the stump ligated, and dropped into the abdominal cavity.
6. The Müller Incision; uterus unopened before ablation; cervix incised and stitched up after the manner of Schroeder, and dropped in.
7. The Porro-Cæsarean Section, constriction with Esmarch tubing, and stump dropped in.
8. The Müller Ablation; uterus not opened; stump secured in the abdominal wound.
9. Utero-ovarian amputation after laparotomy for rupture of the uterus (Prévôt of Moscow).

Thus, we have no less than nine forms of operation, some of them differing very materially from the original, all called by the name of "*Porro*," and classified together, although having very different rates of mortality. It is hardly necessary to claim that this is very unjust to the originator, and unfair to his operation. If the Porro method is to stand upon its merits, rated by its proportion of cures, we must in justice exclude from the record all the cases not strictly deserving of the title. As it would only complicate matters to make nine orders of cases, I propose to combine them where this can be fairly done, and thus reduce the list to four.

1. Nos. 1, 2, 3, and 4 may be classified as *Porro cases*, care being taken to designate those in which the uterus was turned out of the abdomen before incising it as "*Müller sections*."

2. Nos. 5 and 7 will form a *second class*, the distinction being that the stump of the cervix was not secured as designed by Prof. Porro, but dropped in, thereby adding very materially to the mortality of the mothers.

3. Nos. 6 and 8 represent a *third class*, including all the non-Cæsarean ablations of the puerperal uterus, in which the fœtus has not yet reached a viable age.

4. No. 9 constitutes a class by itself. For simplicity we will name the four classes, viz.,

1. { True Porro operations.
 { Porro-Müller operations.
2. Puerperal utero-ovarian amputations, with the pedicle dropped in.
3. Premature ablations of the gravid uterus, the fœtus not being viable.
4. Prévôt's operation, miscalled "*Porro*."

It is just to Professors Porro and Müller to keep their respective methods separate, in rating the mortality of mothers and children, although, where either plan has been adopted in a hospital in a series of cases, there would appear to have been a nearly similar result; as, for example, in the Porro operations of Santa Caterina, Milan, and the Porro-Müller operations of the Allgemeine Krankenhaus, Vienna. It has been stated recently that the Porro operation is falling off in respect to its proportion of mothers saved, when the fact is, that just the contrary is known to be true, by those who write from knowledge, and not from conjecture, based upon the few reports that appear in our leading journals. The reports that have come to me of operations thus far performed in this current year (14), show a recovery of 9, or more than 64 per cent. for all countries. Prof. Porro is now in a position where the prevalence of deformities of the pelvis will enable him to personally test his method in a few years. He has adhered very closely to his original design in operating, as have also his predecessors on the staff of Santa Caterina, except in the instance where Prof. Chiara used the long incision. Thus far, this hospital has saved 9 women out of 12, and all of the children. Thus far, also, Prof. Porro has saved, of his own cases, 4 out of 5.

As an effort is now being made by three several parties in Europe to collect, respectively, first, the Italian operations; second, the first hundred Porro, and Porro-Müller operations; and third, all the so-called "Porro" cases properly classified; we shall in time be able to state authoritatively what has thus far been done by the advocates of the Italian method. These three papers are in the hands of parties who have successfully performed the Porro operation; and the last will, no doubt, from the pains and trouble taken by its author, give us a more reliable and accurate tabular record of all the cases, than any monograph we have yet examined. Being fully conversant with the errors of his predecessors, it will be the aim of the author to avoid them. Personal experience in this kind of work leads me to commend the zeal of him who is willing to do the drudgery which, to be accurate, will be required of him. Of all the different orders of operations that have been styled "Porro," I have a tabular record of 127, of which 14 have been performed since Jan. 1, 1883.¹ It would look like a simple matter to ascertain the accuracy of the reports on which this table is based, and to fill up the points omitted by their authors. I did this once, with a much shorter record, and am very willing now to let another take up the work where I left off, and get the credit which is justly due him.

¹ Since this paper was in type, I have received the voluminous and carefully prepared record of Dr. Clement Godson, of London, which gives of my first and second classes combined, 129 cases and 71 deaths; of the third class, 5 cases with 2 deaths; and of the fourth, 6 cases with no recovery. The dropped pedicle cases are 13 of the 129, and 11 were fatal. Exclude them, and we have 116 operations of my first class with 56 recoveries. The whole record of Dr. Godson, $116 + 13 + 5 + 6$, is 140 cases, with 61 women and 102 children saved.

We have had in this country six *puerperal utero-ovarian amputations*, commencing with the case of Storer in 1869. Of these six, all were fatal to the mother but one, viz., that of Richardson in 1880. Five of the six cases were operated upon in private houses; the exceptional one being the last, that of Dr. Parish, at the Philadelphia Hospital, on June 29, 1883. In one case the fœtus was non-viable; in two cases it was dead, and in three it was saved. In not one of the five operations which date since that of Porro, in 1876, was his method entirely carried out. In three cases the modification of Müller was preferred; and in two, although in other steps "Porro operations," the stump was ligated and dropped in. Thus far the adoption of hysterectomy in some of the Cæsarean operations of the United States has given no advantage in a decreased mortality, as compared with the old method. In 1880, the last year of which I have a full report, there were 5 old Cæsarean operations, saving 3 women and 4 children. The time in labour was respectively, four days, sixty hours, thirty-two hours, thirty hours, and three hours, the last being the only elective case. Of 18 old Cæsarean operations known to have been performed in our country since the new method was introduced into Italy, there have been but four that were performed early, and of these, two were successful. One case that was lost was in extremis from *ante-partum* hemorrhage at the time of the operation; the other had a large pelvic tumour, and died of septicæmia. Our estimation of the Porro operation is based entirely upon the comparative records of the old and new methods in the maternity hospitals of Europe. In the United States, where the Cæsarean operations are usually in private houses, the mortality under the old method, when elective and performed early, has been only from 25 to 30 per cent. Three Porro operations have been performed prior to the commencement of labour, with a loss of two cases. The plan is therefore still on probation with us. As the six old Cæsarean cases in hospital in our country all died, it will be well in the future to follow the example of Dr. Parish, and try whether the Porro method will not be less fatal in its results in hospital maternities here as it has been in Italy, France, and Austria.

APPENDIX.—The valuable monograph of Dr. Godson, already referred to, which is a marvel of painstaking research and accuracy, enables me to present the following analysis, carefully prepared and computed from his tables, which cover nineteen quarto pages:—

A Tabular Record, showing the Porro, and so-called Porro Operations, and their respective Mortality in different Countries, to July, 1883.

Porro operations: true and modified.	Italy.		Austria.		Gormany.		France.		England.		United States.		Belgium.		Switzerland.	
	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.
1. True Porro operations	43	23	14	5	5	5	10	5	3	2	2	1	3	2	2	0
2. Porro-Müller operations	5	3	12	4	9	5	2	2	1	1	2	2	1	0	2	0
3. Pedicle dropped in: (Porro)	1	1	2	2	2	2	..	..	..	..	2	2	..	..	..	..
4. " " (Porro-Müller) . . . . .	..	..	1	1	4	2	..	..	..	..	1	1	..	..	..	..
5. Premature ablation of unopened gravid uterus . . . . .	..	..	..	..	1	0	..	..	2	0	1	1	1	1	..	..
6. The same; with pedicle dropped in . . . . .	..	..	..	..	..	..	..	..	1	1	..	..	..	..	..	..
7. Prevôt ablation of ruptured uterus . . . . .	..	..	..	..	1	1	1	1	..	..	..	..	..	..	..	..
8. The same; with pedicle dropped in	2	2	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Total	51	29	29	12	22	15	13	8	7	4	5	4	5	3	2	0
Women saved	22		17		7		5		3		1		2		2	

Porro operations: true and modified.	Russia.		Holland.		Spain.		Scotland.		Turkey.		Total.		Women.		Children.	
	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Cases.	Lost.	Saved.	Lost.	Saved.	Lost.
1. True Porro operations	1	1	1	0	1	1	..	..	1	0	82	64	38	64	64	..
2. Porro-Müller operations . . . . .	..	..	..	..	..	..	..	..	..	..	34	18	18	26	26	..
3. Pedicle dropped in: (Porro) . . . . .	..	..	..	..	..	..	1	1	..	..	8	8	0	0	7	..
4. " " (Porro-Müller) . . . . .	..	..	..	..	..	..	..	..	..	..	5	5	2	5	5	..
5. Premature ablation of unopened gravid uterus . . . . .	..	..	..	..	..	..	..	..	..	..	4	4	3	3	..	..
6. The same; with pedicle dropped in . . . . .	..	..	..	..	..	..	..	..	..	..	1	1	0	0	..	..
7. Prevôt ablation of ruptured uterus	1	1	..	..	..	..	..	..	..	..	4	4	0	0	0	0
8. The same; with pedicle dropped in . . . . .	..	..	..	..	..	..	..	..	..	..	2	2	0	0	0	0
Total	2	2	1	0	1	1	1	1	1	0	140	102	61	102	102	..
Women saved	0		1		0		0		1		61					

1. "True Porro operations," with the pedicle kept out, 82. Of these cases, 44 died, and 38 recovered. Children removed alive, 64; still-born, or moribund, 19; one woman, having twins, removed in a dying state; she was also lost.

2. Porro-Müller operations (the uterus being turned out before opening it), with the pedicle kept out, 34. Women saved, 18; lost, 16; children removed alive, 26; dead, or moribund, 9. One woman bore twins, which were saved, but she was lost.

3. Modified Porro operations, the pedicle being dropped in, after the ablation of the uterus, 8. Women lost, 8; children alive, 7; dead, 1.

4. Modified Porro-Müller operations, the pedicle being dropped in, 5. Women saved, 2; lost, 3; children living, 5.

5. Premature ablations of the gravid uterus (the organ not being opened, the fœtus not viable, and the pedicle being kept out), 4. Women saved, 3; lost, 1.

6. The same, with the pedicle dropped in, 1. Woman lost.

7. Prévôt's operation (the uterus being removed after laparotomy, following the rupture of the organ, and the pedicle kept out), 5. Women lost, 5; children lost, 5.

8. The same operation, with the pedicle dropped in, 1. Woman and child lost.

After the initial operation by dropping in the pedicle, in 1880, was performed, there were six more in imitation of it within six months, all fatal but the seventh. There was one only in 1881; but in 1882 there were four, and there was one again in January of this year. The fact that the seventh and thirteenth cases were the only ones not fatal, should make surgeons hesitate in adopting Veit's method. Operators may be tempted to treat the stump, as they do the pedicle in a large proportion of ovariectomies, but they should know what is taught by the failures of those who have tried it in the past.

Thus it appears from the above record, that the Porro operation, carried out as originally designed, has saved $46\frac{1}{4}\%$ per cent. of the cases; the Porro-Müller method, unmodified, has saved $52\frac{1}{7}\%$ per cent.; and the two combined, $48\frac{5}{9}\%$ per cent. of the women, and 90 out of 118 children.

The 116 Porro and Porro-Müller operations have been performed in the following countries, viz.: Italy, 48; Austria, 25; Germany, 15; France, 12; England, 4; Belgium, 4; Switzerland, 2; United States, 2; Russia, 1; Holland, 1; Spain, 1; and Turkey, 1 = 116.

The cases of dropped pedicle are distributed as follows: Germany, 6; Austria, 3; United States, 2; Italy, 1; and Scotland, 1 = 13.

The chief operators, counting all their forms of incision and treatment, are Professor Carl von Braun-Fernwald, 11, saved 8, and Professor Gustav Braun, 6, saved 2, both of Vienna. Professor Domenico Chiara, of Milan, 5, saved 3. Professor Edoardo Porro, of Pavia and Milan, 5,

saved 4. Dr. Girolamo Previtali, of Bergamo, 5, saved 1. Dr. Heusner, of Barmen, Germany, 4, saved 0. Dr. Just. Lucas-Championnière, of Paris, 4, saved 2. Professor Domenico Tibone, of Turin, 4, saved 1. Professor August Breisky, of Prag, 4, saved 4. Professor S. Tarnier, of Paris, 3, saved 1; and Professor Josef Späth, of Vienna, 3, saved 2 = 28 women saved out of 54. Of the 26 cases lost, there were 5 in which the pedicle had been dropped in.

The record of Italy, kindly sent me by Dr. Domenico Peruzzi, of Lugo, shows that they have had in that country 43 Porro operations, with 20 women saved; 5 Porro-Müller operations, with 2 saved; 1 Porro-Veit operation (the pedicle dropped in), woman lost; and 2 modified Prévôt operations after ruptured uterus (the pedicle dropped in), both women lost.

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ARTICLE VII.

LIGATION OF THE SUBCLAVIAN ARTERY BETWEEN THE SCALENI FOR HEMORRHAGE FROM A GUNSHOT WOUND. RECOVERY. By MIDDLETON MICHEL, M.D., Professor Medical College, South Carolina, Charleston, S. C.

THE case, whose history we shall furnish at some length, will be found to exhibit an exceedingly rare cause of hemorrhage from gunshot wounds, recognized by some, though scarcely referred to by systematic writers on surgery; as when an artery in the vicinage of a shot-wound loses its vitality at the time of injury, through shock, and, subsequently, more completely through prolonged contact with morbid products in the contused and lacerated wound, shares in the general disintegration of the surrounding structures, and yields, in the course of time, to blood-pressure, giving rise to the rarest form of hemorrhage, and from its suddenness, to the most alarming and dangerous.

The aspect of the subject from this pathological standpoint acquires importance, especially to the military surgeon, as such a rare factor imported into the history of a gunshot wound will have much to do in directing his judgment and influencing his decision in granting furloughs predicated of a supposed cure, or of a progressive convalescence.

We are led naturally to take this view of our subject since the following case occurred during our connection with the wounded of our army in Richmond, Virginia, and though immediately reported to the department by myself, and generally talked of among the surgeons at the Capital, has been incorrectly reported in the pages of the valuable volumes on the Surgery of the War, emanating from the Surgeon-General's Office in Washington.

With regard to this particular case, which follows, I may be permitted to say that, when surprise, which is ever sudden, and alarm, which is always associated with hemorrhage from a large vessel so near the heart, are accompanied with the difficulties of the unpremeditated operation required for the patient's safety, one can readily understand the interest it created at the time among the surgeons at the Capital. This interest, again, is enhanced by the simple history of the case, since, of all the varied causes of hemorrhage which could possibly arise from so remote, so unforeseen, so accidental a cause as some obscure and seemingly spontaneous invasion of only one point in the walls of a vessel through the sluggish eliminative process of a slough from the shot-passage, this is so remarkably rare, that it scarcely occurs, on an average, more frequently than once in two or three thousand instances of gunshot wounds of arteries; indeed, a precisely similar instance was unknown to me from any source throughout the Confederate army, at a time in which I was more or less engaged in consulting almost every official report in the department, through the courtesy of Dr. Samuel Preston Moore. The rare occurrence of a local injury precisely where it must involve surgical interference in the course of one of the largest, yet least accessible, of the vessels of the body; and the ultimate success of a procedure contravening the established rule of local deligation in such emergencies, owing to prohibitory conditions of the vessel-walls; with the strikingly large mortality of from 70 to 80 per cent. in all ligations of the subclavian under any circumstances, and at any part of its course; are some of the particulars which surround this case with more than common interest.

As I review the past, at this late date, it seems ominous that in crowded wards, where once lay the mangled bodies of so many suffering and dying men, whose claims upon our untiring devotion were imperative, yet whose histories hold no special place in our memory now, there was one whose comparatively trivial wounds seemed then to call for nothing more urgent than the accommodating attention to his fur-lough papers, who yet was destined to become more memorable than any of his companions in arms in fixing even his name, as well as the story of his injury, indelibly in our minds. This history, then, may be said to recall the most conspicuous surgical event perhaps resulting from those memorable engagements at Chancellorsville, in which the wounded on both sides numbered 18,000, while no less than 3000 men were killed:—

It was, then, on the 3d of May, 1863, that G. M. Coughman, corporal, Co. K, 13th Regiment of South Carolina Volunteers, aged about 25 years, received his wound from a Minié ball, which entered midway between the vertebral border of the left scapula and spinal column, coursed apparently upward, forward, and to the left, making its exit about two-thirds of an inch below the middle part of left clavicle. There was no primary hemorrhage. Subsequent and oft-repeated hemorrhages from nose and mouth were sufficient to indicate that the pleura had been opened, and the lung

wounded. Hæmoptysis continued from time to time, gradually diminishing until it ceased entirely. Coughman reached Richmond, Virginia, and was admitted into the Manchester Hospital, under my charge, on the 14th of May. His wounds claimed but simple dressings, as there was not more discharge than is wont to occur from such an injury. Absolute rest and decubitus were enjoined, and the cough, which was at first troublesome, having been soon controlled, the subsequent treatment consisted in simple attention to the wounds, which steadily progressed so favourably that in a short time the orifice of entrance in the back completely healed, and the wound of exit below the clavicle had so far closed as to require only a dossil of lint to protect his shirt from the slightest discharge. With returning health and strength he naturally sought to obtain a furlough, which official papers, through recent orders, required to be sent to the field for the signature of General Lee. The delay which this entailed, and long-deferred hope, annoyed him greatly, and it was said that, on permit, he would walk to Richmond again and again to ascertain the fate of his papers; a fact which is here mentioned, as I subsequently learned that it had often been surmised that his health was restored to such a degree that by the time his furlough could be obtained it would be of no avail to him, since, upon an inspection, he would be pronounced well, and would, doubtless, be returned to duty.

On the 2d day of June, I chanced to be detained the entire day at the hospital, not returning to Richmond as usual at two o'clock, when, in the afternoon, I accompanied one of my resident surgeons, Assistant Surgeon Seabrook Jenkins, in his second visit through his wards. We had nearly gone the round when a commotion and alarm in the ward admonished us that something was wrong on the opposite side, where the nurses were endeavouring to suppress hemorrhage in one of the patients by compresses held down upon the chest. We discovered that it was Coughman, seized with a violent fit of coughing, who was bleeding most alarmingly from the wound beneath the clavicle. Arterial blood issuing *per saltum* in so rapid a stream permitted of no delay. I instantly forced my index finger with some difficulty into the wound, breaking through the partly organized, though softened, granulations of the bullet-track, which immediately arrested the hemorrhage. The patient's alarm was exhibited by the beatings of the carotids; I took occasion to assure him that he could bleed no more, that my finger acted as a cork in a bottle; and I requested Surgeon Jenkins to prepare what was necessary for the ligation of the subclavian. Chloroform was administered, and as I removed my finger Dr. Jenkins inserted his, thereby controlling again a hemorrhage yet more considerable than at first, in consequence of the enlargement of the wound. Suspecting the artery not sound in the third part of its course, and that a wound of some depth would certainly be required, ample room became desirable. Depressing the shoulder, I extended an incision the entire length of the clavicle immediately above and parallel to that bone, dividing the structures carefully upon the groove director; a broad clavienslar attachment of the sterno-cleido-mastoid required to be divided, and the external jugular vein was drawn on one side; the structures within the supra-clavicular triangle were cautiously lacerated with the blunt end of the director, which brought the scalenus anticus neatly into view with the phrenic nerve. The size of my incision permitted me to prosecute the operation without any vertical incision, and I had the good fortune to encounter no vessel requiring to be secured, meeting neither the transver-

salis colli nor humeri vessels. My finger, introduced deeply into the wound, felt the subclavian artery, and I recognized the tubercle on the first rib, but finding it impossible to depress the handle of Deschamps's needle so as safely to conduct the instrument around the isolated vessel, I divided the belly of the scalenus upon the director, carefully respecting the phrenic nerve, when I readily conveyed the needle armed with its ligature around a perfectly sound part of the artery between the scaleni. We assured ourselves that the subclavian alone, with no branch of the brachial plexus of nerves, was included within this ligature; the artery was then tied securely in this portion of its course; and when my assistant removed his finger there was no hemorrhage.

During the progress of this operation we seemed not to have invaded the cellular tissue at the apex of the lung, the continuity of which, with the mediastinum and thoracic fascia, places us here on the border of the chest, in a stratum of usually very loose tissue, conducting inflammation with its products readily, surely, and dangerously to pleura and pericardium; indeed, the tissue here, beneath, beyond, and around, appeared condensed through the probable deposit of organized fibrin during the prolonged reparative stages of healing throughout the shot-track. The greater part of our incision was now united by sutures and promptly healed without any untoward symptom, the ligature coming away somewhere between the twentieth or twenty-fifth of June; the precise date I cannot now state, as the operation was performed just prior to his transfer to the Alabama Hospital, in Richmond.

I am ready to confess that, from the general experience with gunshot wounds which, in common with many of our surgeons, we had surely acquired, I looked upon the operation at the moment as only of temporary advantage, expecting, in due time, to witness secondary hemorrhage from the distal end of the vessel. This accident, however, never occurred; on the contrary, this soldier made a rapid and perfect recovery, for, up to the day and hour when I last saw him, he was the constant object of jealous interest to me, and remained perfectly free from accidental complications. I should here state that none of us recognized any indication of the paralysis to which reference is made in the report of this case,¹ in which the reporter complacently hints that it was possibly due to some branch of a nerve of the brachial plexus included in my ligature.

There was no more numbness of the limb, nor stiffness of embarrassed motion, than is met with usually after cutting off the main supply of blood to a part; while a prolonged immobility of the limb, on which I had urgently insisted so as to avoid all possible tension or strain upon the vessel, would of itself, from the stiffness ensuing, have imposed the belief upon some inattentive observer that this is what is called paralysis. As was well known to those around us at the time, Coughman left with no such symptom, when, in obedience to an official order, he was transferred temporarily, with all the wounded and convalescent, to the Alabama Hospital in Richmond. . . .

¹ Surgical History of the War, Part I., vol. ii. p. 538.

The history of this most rare case is pregnant with instructive admonitions, especially to the military surgeon. Engaged as he so often is in determining the safety or danger attendant upon granting furloughs in particular instances, it appears a most important lesson to learn, that the vicinity of a large bloodvessel to the track which a ball has tunneled through the tissues makes it difficult to declare, until the wound has completely healed for a time, whether or not the main artery is threatened with any anticipative or subsequent danger. Had Coughman's furlough reached him earlier, this appalling hemorrhage must have occurred while upon his journey; yet hundreds with wounds not nearly so well as his were daily on their route homeward. How difficult to defer our decision upon so remote a possibility, where no primary or secondary hemorrhage indicates direct injury of the vessel; still, we must remember that there is a remote hemorrhage, scarcely to be expected, a kind of spontaneous dehiscence of the wall of an artery dependent upon the removal of all support against the blood-wave through the slowly softening and molecular disintegration of an infiltrated and ulcerative, or broken-down point; rare, indeed, in a vessel of the magnitude and importance of the subclavian, though so familiar to us all in the attenuated capillaries along the walls of tuberculous pulmonary caverns.

It was this special cause of hemorrhage as here described, so wholly different from that arising from spiculae of bone, from fragments of clothing, from ball, or from any other foreign body, pressing upon, lacerating, or temporarily occluding the blood-channel, which makes this case of subclavian hemorrhage almost unique.

I cannot refrain from calling attention to the pertinent reflections of the late distinguished compiler and annotator of the surgical statistics of the war—Asst. Surgeon George A. Otis—who opens his remarks on lesions of the subclavian artery and vein thus:—

“Wounds of these great bloodvessels occasionally come under the surgeon's treatment. It is quite time that the dictum of Jourdan that surgery is powerless in lesions of arteries within the cranial, thoracic, and abdominal cavities should be expunged from the text-books. At least five cases occurred during the late war, of wounds of the subclavian, in which surgical intervention was justifiable, *and in one of these the left subclavian was successfully tied by a Confederate surgeon, for a wound of the vessel where it passes across the first rib.* Though such lesions are immediately mortal in the majority of cases, there are instances in which the bleeding is delayed or arrested, the laceration of the artery being obstructed by spiculae of bone, or by the missile, or a fragment of clothing, or other foreign substances. In such cases audacity is the part of prudence.”¹

¹ Surg. Hist. of the War, Part I., vol. ii. p. 521. In the above quotation the italics are my own. With Dr. Otis I must express regret that, with official documents before him, Dr. Thomas should, in his report of this case, misspell the patient's name, omit date and name of battle, and date of injury, withhold the surgeon's name who operated, yet go on to state that paralysis existed, and to surmise that some nerve must have been included in my ligation.

Another important feature in this case, not, however, without a parallel in my own personal experience, is the successful application of Anel's method to so large a vessel. The known mortality in ligations of the subclavian artery, excluding pleural, gangrenous, or pyæmic complications, is due to shortness of clot, to numerous collateral branches of large size, and, as I have always believed, to strain or tension upon the vessel in movements of the arm.

This mortality is stupendous, for more than half die in very short periods after the operation, in consequence of recurring hemorrhage from the distal end of the vessel. While such discouraging results would appear due to neglect of the accredited rule of Guthrie, by the defection of some surgeons, yet, as Dr. Otis properly remarks,¹ "the difficulties in dealing with gunshot wounds of the clavicular and axillary regions are so great as often to defy the best planned and most skilfully executed surgical interference; and those whose experience of traumatic lesions of the subclavian and axillary regions is largest are least hasty in criticizing failures in their management."

It is not impossible, nay, it is even most probable, that the histogenetic work of repair throughout this wound, together with consentaneous changes in the walls of the artery, may have obliterated the distal portion of the subclavian so as to deflect the circulation into collateral channels, enlarging the many anastomoses, preparing in advance for the ultimate fulfilment of our purpose. This hypothesis would explain the success of my operation, for secondary hemorrhage may be said to occur nearly always from the peripheral end of an artery on account of the imperfect clot. In no other way do I account for the absence of recurrent hemorrhage. That such obliterations in the calibre of the largest vessels are possible where the vessel has never sustained more than "shock," so to speak, is amply testified to by several necropsic examinations that have been made. Holmes, referring to this subject, says: "About *contusion* of arteries little is really known. It seems undeniable that contraction and even total closure of the artery may follow on mere contusion, and that this may be a cause of gangrene. So Guthrie relates a case in which a bullet passed between the popliteal artery and vein without opening either. Gangrene ensued, and the man died. 'The coats of the artery were not destroyed in substance, though bruised; it was at this spot much contracted in size, and filled above and *below* with coagula.'"²

Some years ago, a white man, Mr. Savage, acting as an overseer on Dr. Keith Furman's plantation, on Daniel's Island, received a stab-wound which compromised the brachial artery just in the neighbourhood of the origin of the superior profunda; the wound was immediately closed with stitches, and a firm compress applied with bandage. Strange to state,

¹ Surg. Hist. of the War, Part I., vol. ii. p. 557.

² T. Holmes's Surgery, Am. ed. 1876, p. 107.

the wound in the arm, or skin, healed very promptly, but a traumatic aneurism necessarily ensued. Dr. Furman sent him to the city to me, requesting me to operate. In this instance, though but a few days after the receipt of the injury—in a comparatively fresh wound—in a clear case of pulsating traumatic aneurism of the brachial artery, I nevertheless ligated the axillary in the deepest part of its course in the armpit; the pulsations in tumour immediately ceased, no recurrent hemorrhage ensued, and the recovery was rapid and complete. Here again the Hunter, as above the Anel, method succeeded perfectly. I can but regard success in so recent an injury as an exception to the accepted rule of practice, which it would not be wise always to follow, nor would I have myself pursued precisely this course, but for the expression of the opinion of my colleagues at the time as to the possible condition of the vessel above and below the aneurism.

The minute history which I record forbids my pretermittting some reference to the pulmonary difficulty here involved. Can we lose sight of the frequent hemorrhages from nose and mouth, and the obstinate and troublesome, and, it may be added, almost fatal, cough, which ultimately dislodged the slough or ruptured the attenuated wall of this artery? For some time after Coughman fell wounded at Chancellorsville he continued to suffer from what the field-surgeon reported as hæmoptysis, and, though I never witnessed an attack of veritable hæmoptysis after he came under my care, yet expectoration of mouthfuls of blood and bloody saliva, the result of a constant cough, is well fixed in my memory, for this was about the only symptom for which he was occasionally treated by Dr. Jenkins.

We step upon debatable ground when we are willing to take any single symptom as pathognomonic of lung-wound, for neither hemorrhage, dyspnoea, traumatopnoea, etc., nor even auscultatory revelations, are sufficient to establish clearly a gunshot lesion of the pulmonary tissue; yet the subsequent rupture of the subclavian, which actually indicated the transit of the ball in a direct line from point of entrance to exit, certainly proved that the pleura must have been opened and the lung wounded, independently of any pulmonary symptom. Even if we indulge the missile in the most eccentric deflections around the thoracic cage, it seems to me impossible that this artery could thus have suffered. This pulmonary wound was followed, however, by no serious complications, for there was neither traumatic pleurisy nor pneumonia; abscess nor effusions; though pleurisy is so likely to follow chest-wounds where the ball has never penetrated the pleural cavity, nor even wounded the pleura. Here, then, again, is an important point in the case. Recovery under these circumstances might very well surprise us had we not been familiar with wonderful recoveries after the most serious injuries of the lung; one of the most marvellous, perhaps, of which was brought before our Association of Army and Navy Surgeons by Dr. W. G. Thom, a synoptical but full report of which, from my pen, was published in the *Confederate*

States Medical and Surgical Journal for April, 1864, and copied into the second volume of the *Surgical History of the War*, page 597. In this instance the pleura and lung were terribly wounded, and an English patent-lever watch, with portion of its accompanying chain, etc., was driven into the chest. Imbedded in the lung for some time, during the process of granulation, while dressing this wound, the watch was discovered by its metallic lustre, when the greater part, together with the links of the chain, was removed, the wound gradually healed, cough continued, and in course of time the patient expectorated all the small works of the watch, which are said now to be in his possession. As severe an injury as this well-attested example affords was nevertheless unaccompanied by any of those reasonably-to-be-expected pathological sequels of which we have spoken above, at least not to a fatal extent.

If we have dwelt tediously, it may be, upon Coughman's case, it has been because we believe that any reflections upon attempts at occlusion of the subclavian artery by ligature, and the results which may have followed the operation, present at once a subject of momentous interest to the surgeon on account of the rarity of the event. Dr. T. G. Morton, of Philadelphia, tells us that at the Pennsylvania Hospital between the years 1835 and 1868 the subclavian had been tied but once, with a fatal result.¹

The operation is rare *per se*, and the special condition to which we have called attention is still more so. In certain instances where it is said to have been done, the circumstances influencing the result will be found to be wholly different, as where the vessel has been tied for an aneurism, which may of itself have secured all danger from distal hemorrhage; or for some lacerated wound from a railroad accident which has torn away the shoulder, and the artery in its extreme third portion of its course is picked up with a tenaculum and secured to save the patient from dying immediately. How great must have been the immortal fame of the illustrious American, Valentine Mott, of whom Dr. Gross says, "No surgeon, living or dead, ever tied so many vessels, or so successfully," when we learn that he ligated this vessel alone eight times! During the Franco-German War, Prof. Billroth performed the operation three times, and saw it executed twice by other surgeons, yet of these five ligations during that war one only of these patients is *believed* to have ultimately recovered.

With no more appropriate words can I close these remarks than with those of Dr. Otis: "Since the achievement of Dr. Billroth and others in the recent Franco-German war, I am led to regard the management of wounds liable to involve the great vessels at the upper part of the chest as perhaps the most important field of study for those who occupy themselves with questions of what the French term *la haute chirurgie*."

CHARLESTON, July, 1883.

¹ Am. Journ. Med. Sci., April, 1876, p. 334.

ARTICLE VIII.

GALVANO-PUNCTURE FOR THE CURE OF ANEURISM. By T. R. CHAMBERS, M.D., of East Orange, N. J.

THIS operation deserves more recognition in this country than it has obtained.

The following experiments were undertaken in the study of the subject. The case reprinted is from the *Bulletin of the New York Pathological Society*.¹ Perhaps the adverse criticism which it has received may not seem quite justified when attention is called to certain points in the case.

An albuminous fluid held in the palm of the hand was subjected to the influence of a galvanic current from twenty-one cells of a Stöhrer battery. Two needles acted as poles. Great electro-chemical action took place. There was no pain, notwithstanding the proximity of the poles to the skin, as long as they did not touch it.

A sheep's gall-bladder was thoroughly washed out. Two short glass tubes were fastened in openings made in it, opposite each other. One of the glass tubes was connected with the carotid artery of a healthy calf and its blood was diverted into the collapsed gall-bladder, which, when it became distended, pulsated like a real aneurism. The escape of blood from the bladder was controlled by sufficient digital pressure upon a rubber tubing attached to the second glass tube to simulate the condition of obstruction existing in the exit of blood from the aneurismal sac. This imitation aneurism, 8 x 5 x 5 centimeters in size, pulsated for five minutes fed by the blood of the calf's carotid. It was then disconnected and immediately opened—it contained no coagulation.

A bladder similarly arranged was connected with a calf's carotid, and when it began to pulsate, a needle insulated for half its length was plunged into its interior. This needle became the positive pole of a twenty-one cell galvanic current, while the negative pole was applied by coils of wire externally. The current was continued for five minutes when the bladder was disconnected as before and immediately opened. The needle was found in the centre of a firm, hard coagulum 3 x 2 x 1.5 centimeters in size.

Another calf was taken and both poles were introduced into the pulsating bladder arranged as before. The result was unsatisfactory; froth, gas, and tar seemed to be generally commingled when the bladder was cut open, though there was some firm substance about the positive needle.

Then in still another bladder two needles were introduced and the current alternated, with a like unsatisfactory result.

From these experiments, I think, an idea of the relative value of the different methods employed may be gathered. Of course there are many

¹ Volume for April—November, 1881.

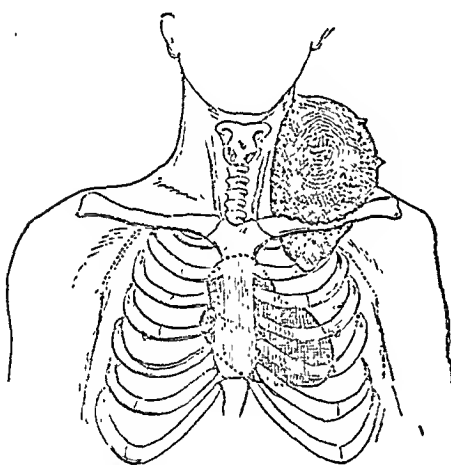
objections in likening these crude imitations to the true aneurism as it occurs in man. Yet, if nothing more, it shows that the positive needle only should be introduced into the tumour. The pain is only what occurs with the prick of a pin.

Suppose the current of blood in an aneurism could be stopped by distal compression for fifteen minutes or longer, and the positive pole inserted for five minutes in three or more different places, does it not seem impossible for the sac to escape entire consolidation?

The results obtained agree with the conclusions of Robin, quoted hereafter.

The following case, presented to the New York Pathological Society, is published at this time because unfavourable criticism of the operation has appeared.

The man was apparently about to die, and desired to try galvano-puncture in the full knowledge of our inexperience in this country.



The operation, notwithstanding the alternation of poles, no one can say hastened his death an hour. He lived four months and a half after it, and during *three months* of this time was in comparative comfort, many of the distressing symptoms disappearing. This fact remains whether *post* or *propter hoc*. The author believes with others that if the positive pole alone had been introduced as before suggested, cure would

certainly have resulted, and the man spared to a life of usefulness. The accompanying figure is a very nearly true representation of the pathological condition of affairs during the last week of the man's life. It shows an immense tumour quite as large, if not larger than the unhyperthrophied heart; the places of pouting; the inclusion of the first and second ribs and clavicle; the atrophied arm.

Andrew J. W., United States, aged fifty-three, married, a printer. Inheritance and habits good; no syphilis; one attack of rheumatism, lasting one month, in his ankles, about twenty years ago.

The first symptoms of aneurism began three years ago with pain in the little finger of his left hand, and gradually extended into the arm and whole upper extremity. In January, 1880, the subclavian aneurism had become a prominent tumour upon the left side of the neck, with visible pulsation, thrill, and bruit. The pain was chiefly referred to the upper extremity, scarcely any being felt in the tumour itself. Iodide of potash had been administered during the past year, continuously. At times large

quantities of morphine were necessary, and occasionally his mental disquietude required the addition of a mixture of chloral and camphor, equal parts; which proved of great service for disturbed sleep, and calmed his maniacal tendencies. Dr. R. F. Weir examined the patient and found a continuous bruit across the manubrium sterni, that did not seem to be cardiac; but which, together with the patient's complaint of pain in the cervico-dorsal spine, led him to suspect dilatation of the arch of the aorta. The cardiac physical signs failed to reveal any pathological changes. The tracing of the left radial pulse, obtained with great difficulty on account of the smallness of the current, yielded the usual wavy descent found with obstruction along the course of an artery. In March, there was œdema of the left upper extremity, as well as of both ankles, and the doses of morphine had reached the enormous quantity of thirty centigrammes in a single day.

On March 30th, he had a sudden attack of dyspnoea, and for two weeks was compelled by weakness to remain in his chair, being unable to walk: dorsal decubitus was uncomfortable. On April 23d, he had a chill and fever, with abdominal pain and swelling; and the same symptoms were repeated on May 31st, when the abdominal swelling assumed quite an extensive size, requiring surgical interference to evacuate a cupful of pus, from an abscess in the abdominal wall.

On May 19th, a plaster cast was taken of the shoulders and neck. There was a large tumour rising above the left clavicle, between it and the trapezius behind; bounded externally by the acromial end of the clavicle, and rose internally almost to the border of the inferior maxilla.

There were at no time symptoms of pressure upon the trachea or carotid, but only signs of compression of the nerves of the left cervical plexus and of the veins of the same region, together with a diminished blood supply.

Oct. 8. The aneurism has slightly increased in size and shows a tendency to pointing; and the pain in the region supplied by the brachial plexus has become so excruciating that the patient wished to try anything (!) to relieve his sufferings.

*Needling.*¹—Six milliner's needles four and a half centimeters long were introduced, and on the next day nine more were inserted into the tumour, care being taken to avoid the direct blood current. Some of the needles gave slight pain on piercing the skin, others none. After remaining imbedded in the tumour for six days, the needles were removed; there was no apparent change in the aneurism.

24th. There is visible pulsation and expansion in every available part of the tumour. A thrill is felt posteriorly adjacent to the neck, and a distinct bruit is heard everywhere, especially over the region of the thrill. The blood current approaches the surface in several places, and very threateningly at points of pointing.

Galvano-puncture.—With the kind advice and assistance of Dr. E. Evetsky and Dr. G. L. Knapp, galvano-puncture was resorted to. The apparatus employed was a Stöhrer's battery of twenty-one cells; a rheostat by which the intensity of the current could be gradually raised or lowered between a single couple and the full strength; and six milliner's needles, eight centimeters long, with their points changed to sharp, flattened spear-heads; the latter were insulated by collodion, which increased their size from No. 2 to No. 4, French. Three centimeters of polished steel of the needle were to be exposed in the tumour.

¹ See Heath on this operation, *Lancet*, January 31, p. 168.

First séance.—The patient being etherized, two needles were inserted parallel to each other, two centimeters apart; then a strong galvanic current was passed through them and the poles alternated every five to eight minutes. They remained inserted about forty-five minutes. When withdrawn a peculiar black-and-blue appearance of the whole upper extremity was noticed. One of the needles had lost its exposed steel, which had been utterly consumed, not broken off—an accident which has happened to some experimenters; the other needle was rough, black, and thinned. Their removal was accompanied by the escape of gas and tarry fluid. The patient passed pleasantly out of the etherization. Slight change in the shape of the tumour was observed; the thrill was diminished; and there was a seeming condensation of the contents of the aneurism beneath one of the punctures.

For four days there was no change noticeable in the tumour nor in the patient's condition, which was very good.

Second séance.—Oct. 29. On this occasion it was with considerable difficulty the patient was etherized. The current passed through two needles inserted as before. Within five minutes of starting up the current, a scarlatinoid rash appeared on the left shoulder and upper extremity, and gradually darkened and became black and blue in irregular patches. The thrill disappeared. On withdrawing one of the needles, a subcutaneous hemorrhage at the puncture occurred, forming a secondary hematoma almost as large as the aneurism itself, but pressure finally controlled it. After fifteen minutes' interval, two fresh needles were introduced in other places near the thin parts of the sac, and the current was passed as previously described, alternating the poles every five to eight minutes, until the whole *séance* lasted forty minutes. On withdrawing one of the needles, a bright arterial stream spurted out of the puncture, but this was soon controlled by pressure.

The patient did not come out of the etherization, but went into a state of coma, from which he only partly emerged two days later, but with external strabismus and almost constant nausea and vomiting. For four days after, there was severe headache and complete loss of vision even to recognition of light. The black and mottled appearance of the arm gradually disappeared at the end of a week; and blebs, which had formed upon palmar surfaces of the second and ring fingers, gradually dried up after two weeks; ecchymotic spots scattered over the arm and hand also disappeared.

With the exception of these two weeks, for *three months* after the operation there was a great amelioration of the symptoms, so that the patient only had to take an occasional dose of morphine. During the latter part of February, 1881, the pain in the tumour became very severe; formerly the pain had been confined to the shoulder, arm, and hand.

March 6 (*four months and ten days since the galvano-puncture operation.*) The tumour attained to the size of a baby's head, and had three places of pouting where the sac wall was scarcely the thickness of paper. His body was constantly bathed in perspiration; his mind wandered; vision was completely lost; but hearing was very acute. He refused to swallow any nourishment, lest in the effort the aneurism should burst; but at 2 A. M. the upper place of pouting gave way while the patient was at stool, the blood squirted across the room and struck the opposite wall, and oozing continued for four hours, notwithstanding the pressure applied.

On March 9th, a second rupture occurred from another place of pouting, and oozing lasted for half an hour.

On March 10th, a third hemorrhage from a re-opening of the upper place of pouting occurred, and it required digital pressure for an hour and a half to stop it.

14th, 12.30 A. M. Patient was drawn up in bed for half an hour by agonizing pain in the tumour, when suddenly his pain was relieved and he died quietly. There was a slit two centimeters long in the upper anterior part of the tumour.

Autopsy, twelve hours after death.

Body not emaciated; features placid; no œdema. There is a depression in the suprascapular region, where the tumour had existed; and the left upper extremity was atrophied.

Abdomen.—The subcutaneous adipose tissue was abundant. The muscular layers on the right of the median line, where the umbilical tumour¹ had presented, were thinned. Peritoneal adhesions over a surface an inch square anteriorly upon the right lobe of the liver; *none elsewhere*. There was injection and slight thickening for a space the size of the palm of the hand at the site of the abscess in the right lumbar region. *Vermiform appendix* normal; *intestines* also.

Thorax.—No adhesions; there were no signs of pressure upon the sternum or the spine. *Heart*, in normal position, firmly contracted, hard and anæmic; *no hypertrophy*; in fact the left ventricular wall seemed thinner than it should be, and its muscular tissue was brown. Aortic valves slightly atheromatous and thickened.

Kidneys, both of normal size; capsules not adherent; slight increase of connective tissue in cortex.

Spleen, not abnormal; liver slightly large, somewhat fatty.

Aorta.—Immediately upon leaving the valves the arch was greatly dilated in circumference and length throughout. Its lining membrane had numerous elevations and depressions, indurations and scars, ulcers of recent endarteritis and ectasies, so that there was scarcely any normal appearance. The openings of the innominate, left carotid, and subclavian and of the descending aorta were enlarged and atheromatous. The descending aorta was normal, except at its commencement. There was a branch given off just below the innominate artery, which probably supplied collateral circulation to the upper extremity. The branches were all given off near the descending aorta. The dilatation was more extensive between the aortic valves and the innominate than elsewhere.

The subclavian artery branched off just above the opening of the descending aorta, and for eight centimeters it was irregularly dilated and atheromatous; it had two or three very small branches and blind pouches, and emptied by a constricted ring into the *subclavian aneurism*, which was a pear-shaped tumour about thirteen centimeters long and nine wide at its base, extending, when distended, from the inferior maxilla to the second rib; lying upon it and the first rib, which was included in its cavity; and in close apposition with the carotid artery and side of the neck. Behind, it pressed upon the cervical plexus; externally, upon the scapula and clavicle; and anteriorly upon the clavicle, which was also included in the aneurism for a distance of four centimeters. Both the first rib and clavicle were eroded. The sac itself was thin in places, but strengthened by laminated blood-clots. The six punctures made by the galvanic needles were readily seen, and one was in the centre of a black infiltration, one centimeter square. There did not seem to be any connection between

¹ Reported in the New York Medical Journal, December, 1880.

the blood-clots and the punctures. There were a number of dark clots adhering to the sides of the aneurism, which could be washed off by a gentle stream of water. The fatal rupture did *not* start from a puncture. A few small arterial twigs were seen, and the axillary artery was only about the size of the lead of a lead pencil. There were no vestiges of the first needling operation.

This case is interesting for a number of reasons: First, on account of the rarity of subclavian aneurism on the left side; and on account of the long duration of the disease in its advanced condition; the patient carried a pulsating tumour upon the side of the neck for two years and a half, and a fortnight before death it was as large as a child's head. Three hemorrhages through openings in the sac occurred during the week before the fatal rupture. Were the strange sequences due to the galvanic current, to the etherization, to blood-poisoning, or to embolism and thrombosis? There is no doubt a large quantity of foreign matter was thrown into the circulation by the decomposing action of the electric current upon the steel needles and the blood. A clot formed at the positive pole was broken up when the poles were alternated. There were no casts in the urine, and but a faint trace of albumen at any time.

The autopsy revealed a second aneurism of the arch with extensive ulcerative endarteritis of the same; it also confirmed the diagnosis that the iliac abscess was confined to the abdominal wall, and showed that, notwithstanding the immense obstruction to the circulation by the two aneurisms, the heart was not hypertrophied nor was there insufficiency of the valves.

Galvano-puncture, for the cure of intra- or extra-thoracic aneurisms has scarcely had a fair trial in this country, while in Europe it has had careful study. The first cure reported was that of Petrequin, in 1845, of a temporal aneurism. Then followed a number of failures, and the Italian Commission formed at this time was very sceptical. In 1846, Ciniselli tried it for the cure of aneurisms of the aorta. England, Germany, and France have had many experiments, and especially valuable have been the results obtained by Dujardin-Beaumetz and Dr. Laurent Robin.

Robin says: 1. It is scientific and rational, and yields practically good results. 2. It is the best therapeutical agent employed thus far, for it determines in an aneurismal sac the formation of a clot susceptible of organization. 3. The positive pole alone should be introduced into the tumour to obtain a firm and resistant clot. 4. This mode of treatment, when employed with all the precautions pointed out in his work,¹ is devoid of all danger of embolism, hemorrhage, suppuration, gangrene, or of any other unpleasant accident. It invariably procures relief even in desperate cases.

An old idea was that coagulation was due to inflammation of the sac surrounding the punctures; another was that the electric current itself

¹ De l'électro-puncture dans la cure des anévrismes intrathoraciques, 1880.

caused clotting (Dr. Smee¹ passed oxygen and hydrogen through an albuminous fluid, and obtained a substance resembling fibrin). Robin is certain "that coagulation is due to the chloride of iron and acid formation of the positive pole, while it is generally agreed that the gelatinous froth of the negative pole does not tend to organization." He says further, "the operation is painful, but this is relieved by etherization." If I have the opportunity again, the operation shall be done without ether, for it is *not* necessarily a very painful operation. The gas formed in the aneurism is never sufficient to embarrass the patient. The needle punctures may be so small that there need be no fear of hemorrhage, especially if pressure may be applied.

"The current should not be less," says Robin, "than about twenty-one cells of a Gaiffe, Bunsen, or Stöhrer battery; it should gradually be increased from zero to the greatest intensity, and *vice versa*; and it should be continued about five minutes upon one needle, then upon another, inserted a short distance off, and so on upon several needles, it should *not* be alternated. When the two poles upon two needles are introduced the action is more energetic, and the clot is formed more rapidly, but is imperfect and soft. No clot is formed by the negative needle, but that of the positive is solid, resistant, and adherent." It seems probable that in the case just cited the induration within the tumour was changed, when the current was alternated, from a firm consistency to a frothy, gelatinous, and easily removable matter. Perhaps so much foreign substance thrown suddenly into the circulation was the primary cause of all the peculiar phenomena of central disturbance following the second *séance*.

Robin thinks the clot is due solely to chemical changes, and suggests always using iron or steel needles, rather than platinum, zinc, or silver. The clot, he says, is a coagulation of albumen, solidification of fibrin, and an exudation of plastic lymph.

With regard to the battery, it is necessary that it consist of about twenty-one small elements, as these produce the least amount of thermic action, and the greatest intensity of electro-chemically decomposing and destroying power. The battery of large surface elements is useful as a galvano-cautery; the smaller in coagulating or dissolving, according as the positive or negative pole is used.

An extensive bibliography of the subject may be found in Robin's work, and the statistics of the work are easily summarized. In a table there would be found a great many cases under the heading of amelioration referring to lessening of pulsation, arrest of development of the tumour, relief of pain, partial or complete, and alleviation of the dyspnoea. In most cases there would be only one *séance*, in others even a dozen or more.

Ligation had 33.1 per cent. of death, and galvanism only 12.9 per cent., including the bad success of Cimicelli (Norris's table of ligatures).

¹ Royal Soc. Trans. 1863.

Hutchinson, in 1856, compared it with compression, and found 25 per cent. success, and 29 per cent. failure in compression; while galvanism counted 24 per cent. success, and 30 per cent. failure. But if the positive pole alone be introduced as before mentioned, the statistics shall be wonderful in cures.

ARTICLE IX.

CLOSURE OF THE JAWS AND ITS TREATMENT, WITH THE REPORT OF A CASE IN WHICH COMPLETE OCCLUSION FOLLOWED A GUNSHOT WOUND OF THE LEFT SUPERIOR MAXILLA, RECEIVED AT TWO AND A HALF YEARS OF AGE, AND WHICH WAS RELIEVED EIGHTEEN YEARS SUBSEQUENTLY BY OPERATION ACCORDING TO A NEW METHOD.¹ By J. EWING MEARS, M.D., Prof. of Anatomy and Clinical Surgery in the Penna. College of Dental Surgery, Demonstrator of Surgery in Jefferson Medical College, etc.

CLOSURE of the jaws exists, as is well-known, under two forms—the spasmodic or temporary, and the chronic or permanent. The former occurs usually in connection with some condition which produces irritation in the motor filaments of the third division of the fifth nerve, causing spasmodic contraction, notably of the masseter and internal pterygoid muscles. Among the causes may be enumerated delayed or difficult eruption of the third molar or wisdom teeth of the lower jaw, the development of tumours from the external surface of the ramus and body of the lower jaw, alveolar abscess in connection with the posterior teeth, necrosis, suppurative tonsillitis, and finally I have observed it to follow operations upon the lower jaw when performed in the molar region.

For the relief of these conditions the treatment consists in the removal of the causes. When dependent upon the impeded eruption of the wisdom tooth, the mouth should be opened by levers under the influence of an anæsthetic agent, and the second molar tooth should be extracted so as to afford space for the third molar, or, if it is found to be an imperfectly developed tooth, as sometimes happens, the offending organ should be removed. For purposes of mastication, the third is regarded as of less value than the second, and it would seem, therefore, to be better practice to remove it in all cases. Where tumours, necrosis, and alveolar abscesses exist as causes, the treatment is obvious. After operations in the molar region of the lower jaw, antispasmodic remedies should be administered and water, as hot as it can be borne, should be held in the mouth in contact with the parts so as to allay irritation.

In permanent closure of the jaws we have quite different conditions to

¹ Read at the meeting of the American Surgical Association, held in Cincinnati, Ohio, June 1, 1883.

deal with. The contraction is not due, in this form, to the perverted function of pre-existing structures, but to the formation of adventitious tissues, which firmly and permanently lock the jaws and in some forms defy successful removal. Although not a very unusual occurrence, it would appear, from an examination of surgical text books, that the description and treatment of this truly distressing condition have not, until a recent period, claimed the attention their importance deserves.

In vol. iii. of the third American edition of Velpeau's Surgery, edited by Dr. Valentine Mott, of New York, the latter, under the caption of Concluding Remarks, records sixteen cases which came under his care from 1812 to 1843, and in which he operated with great success, accomplishing *perfect cures* in all instances save one. He enumerated three causes upon which "immobility of the lower jaw" depended. The first and most frequent cause was the formation of unyielding cicatrices, resembling, as it were, *adventitious ligaments*. A preternatural rigidity or dynamic contraction of the muscles was stated as the second, and the formation of an osseous plate of bone connecting the upper and lower jaws was given as the third cause. His process of surgical treatment consisted in the use of an instrument constructed upon the screw and lever principle with which the jaws were forcibly separated. The instrument employed was devised by Scultetus, and depicted in his *Armamentarium Chirurgicum*. In one case (in 1831) all efforts to separate the jaws were ineffectual, and he regretted myotomy was not known at the time the operation was performed, for he was persuaded that subcutaneous division of the masseter muscle would have liberated the jaws, and resulted in rendering complete his list of perfect cures. With the expression of high respect for the opinions and statements of this distinguished surgeon, I cannot think that he was afforded the opportunity of examining, at the expiration of a sufficient period of time, the results of his method of operation in the cases recorded.

In the Jacksonian Prize Essay of 1867, Mr. Christopher Heath, of London, recorded cases in which he had performed operations for relief of permanent closure of the jaws, and in a chapter devoted to the subject collated the work of others up to that date. According to Mr. Heath's statements, English text books on surgery were remarkably barren of any information upon the subject. He alludes to a reference of Mr. Cooper, in his *Surgical Dictionary*, to a case treated by Dr. Valentine Mott, in 1831, in which an operation was performed for closure of an opening in the cheek caused by sloughing and accompanied by closure of the jaws. In the edition of Cooper's *Dictionary*, issued in 1861, closure of the jaws is described as occurring after "sloughing of the cheeks and gums from profuse salivation, the cicatricial bands being so rigid as scarcely to allow of the separation of the teeth, but they became more pliant in time." The latter part of this statement, Mr. Heath very justly says, is not borne out by general experience. Due credit is given to our distinguished President,

Prof. S. D. Gross, for giving "by far the most complete account of the affection in his large work on Surgery."

Prof. Gross, in the first edition of his *Surgery*, states, as the most common cause, according to his observation, "profuse pyalism followed by gangrene of the cheeks, lips, and jaw, and the formation of firm, dense, unyielding inodular tissue, by which the lower jaw is closely and tightly pressed against the upper. In the worst cases there is always extensive perforation of the cheeks permitting a constant escape of the saliva and inducing the most disgusting disfigurement. A second cause is given as ankylosis of the temporo-maxillary joints, consequent upon injury or arthritic inflammation. The formation of an osseous bridge, uniting the jaws or extending from the lower jaw to the temporal bone, is assigned as the third cause. The effect of the closure is stated to be a serious interference with mastication and articulation, and if it occur early in life it is often followed by a stunted development of the jaw.

With regard to treatment, Prof. Gross states that ankylosis of the temporo-maxillary articulation may be relieved by forcibly depressing the lower jaw with wedges or levers, an anæsthetic agent having been administered. In order to prevent re-formation of the adhesions, the lever is to be used daily for many months or years. When the immobility depends upon the presence of inodular tissue, the proper remedy is excision of the offending substance—an operation which is both tedious, painful, and bloody, and unfortunately not often followed by any but the most transient relief owing to the tendency in the parts to reproduce the adhesions, however carefully and thoroughly they may have been removed. After the excision is effected, the patient must make constant use of the wedge, wearing it for months and years so as to counteract the tendency to reclosure. In a large experience, Prof. Gross found that but few patients were permanently relieved by operations of this kind. Where immobility of the jaw is caused by the formation of an osseous bridge it may be remedied by the removal of the adventitious substance by means of the saw and pliers. Sometimes, however, such a procedure is rendered inexpedient on account of the long duration and excessive firmness of the ankylosis and the large quantity of the new osseous tissue.

In cases of long standing it is recommended to divide the masseter muscle subcutaneously and with great care, lest important vessels be divided. Plastic operations may be performed to close the gap in the cheek which may follow salivation.

I have made these liberal quotations from Prof. Gross's work in order to show how little confidence was reposed in the methods of operation then in vogue in this country at least, and how unsatisfactory the results were which followed their employment.

In 1855, Dr. Friedrich Esmarch, Professor of Surgery in the University of Kiel, read an essay at the Congress at Göttingen on the "Treatment

of Closure of the Jaws from Cicatrices."¹ In this essay he gave an elaborate description of the anatomical relations and histological characters of the mucous membrane of the cavity of the mouth, as well as of the pathological conditions which occur in cicatricial formations in this membrane. He described the outer space, or buccal cavity as it is termed, between the alveoli and teeth and cheek and lips as an elastic dilatable sac, and showed that as soon as this sac shrinks together, loses its elasticity, or is replaced by a rigid substance, the mobility of the jaw must either be impaired or entirely cease. After ulceration or sloughing of the mucous membrane, cicatricial contraction ensues, which the depressors of the jaw cannot overcome. If the cicatricial tissue is entirely excised, re-formation of a cicatrix, possessed, if anything, of greater powers of contraction, takes place. Mechanical appliances, it is true, such as the metal shields of Mr. Clendon, of London, dentist, may retard and limit, to a certain extent, this formation, but it requires their constant use for long periods of time, and under very painful and trying conditions to the patient. In order to supply the place of the destroyed mucous membrane, Dieffenbach suggested, after division and separation of the cicatrix from the bones, the covering of the raw surfaces with sound mucous membrane transplanted from an adjacent part. In the most favourable cases this is almost impossible, owing to an absence of sufficient healthy mucous membrane near by. Jaesche, in 1858, recommended the use of a flap of skin instead of mucous membrane, which may be also difficult to obtain from a favourable point. Esmarch, however, would not hesitate to take a flap of skin from so remote a part as the arm. In view, therefore, of the pathological conditions which exist in these cases, and of the great difficulties presented in overcoming them, as well as the failures which followed efforts made, Esmarch recommended the formation of an artificial joint in front of the contraction, in order to give the other half of the jaw some, although a limited, motion. This joint was to be formed by the excision of a segment of bone of such size as to prevent union of the divided ends, and the operation was performed by an external incision along the base of the jaw.

Although this operation was suggested by Prof. Esmarch in 1855, the method was not employed until 1858, and then by Dr. Wilms, of Berlin.

In 1857, shortly after the suggestion of Esmarch had been made, Prof. Rizzoli, of Bologna, operated for permanent contraction of the jaws by a simple division of the lower jaw in front of the cicatrix, using for that purpose powerful forceps applied within the mouth. In order to prevent union he inserted a piece of gutta pereha between the cut surfaces of bone, which procedure, it is stated, was accomplished successfully. Satisfactory results have been achieved by English and Continental surgeons by the

¹ Die Behandlung der narbigen Kieferklemme durch Bildung eines künstlichen Gelenkes um Unterkieferkiel, 1860.

employment of both of these methods. Many years before, Dieffenbach had endeavoured to relieve the closure of the jaws by the division of the ramus of the jaw, and in this manner obtain the formation of an artificial joint. This method of operation was not followed by complete success.

In cases where closure results from ankylosis of the temporo-maxillary articulation, Mr. Heath recommended either division of the bone or resection of the joint, giving preference to the former on account of the ease with which it could be performed from within the mouth "by dissecting up the mucous membrane and masseter muscle so as to introduce a narrow saw or strong bone-forceps and dividing the ramus as high up as convenient, and thus establishing a false joint as originally proposed by Dieffenbach for cicatricial contractions.

He also quotes from Sédillot the case of true ankylosis in which M. Grube, in 1863, divided the ramus of the jaw from within the mouth with a straight chisel, and in this way formed a false joint. The masseter muscle was subsequently divided subcutaneously, and the cure was permanent.

In the last edition of his work on Surgery, Prof. Gross refers to the two methods suggested by Mr. Heath, neither of which he characterizes as very promising nor easy of execution. He reports a case of complete synostosis of the lower jaw on the left side, the result of rheumatism, in a girl seven years of age in whom, in 1874, he excised the condyle along with a portion of the neck of the bone, and succeeded in establishing excellent motion. The parts were exposed by a curvilinear incision in front of the ear with hardly any loss of blood, and the condyle was prized out of its socket by means of an elevator which combined the principles of a lever and a knife.

Under the date of Dec. 6, 1845, Dr. John M. Carnoehan, of New York, in a communication addressed to Dr. Townsend, translator of Velpeau's Surgery, called attention to the fact that he was the first to put into practice the division of the masseter muscle, and the first to propose simultaneous division of the masseter and temporal muscles of one or both sides, and the formation of an artificial joint on the inferior maxillary, either by simple division of the bone or by excision of a portion of it as a remedy for immobility of the jaw. In this communication he reports at length a case upon which he operated in 1840. After dividing the adhesions and applying the screw lever, he failed to separate the jaws; he then divided the masseter muscle subcutaneously with a narrow tenotome, and again applied the lever. Again the efforts were without avail, and before resorting to division of the temporal muscle, as was his intention, he reapplied the lever, and under the force employed the jaw was fractured in its body. The patient could now open the mouth to the extent of an inch and a half. The result following this accident, and the successful attempt of Dr. John Rhea Barton, of Philadelphia, to form an

artificial joint in the femur, suggested the application of this principle to the lower jaw. With the intention of putting this plan into execution at a future day, the union of the fractured bone was permitted to take place, and the jaw became again immovable, with a slightly increased space between the teeth. So far as I am able to ascertain, the operation suggested was never performed. The inference he drew from the results in the case was that mere fracture or section of the inferior maxilla, even accompanied by repeated and free motion, would be insufficient to produce an artificial joint, and that to fulfil this indication the entire excision of a portion of that bone (towards the angle or at some other locality which the nature of the individual case might suggest) would be necessary. It will be seen from this statement of Dr. Carnochan that the operations described as that of Esmarch and of Rizzoli were, in fact, suggested by him some fifteen years previous to the presentation of the essay of Esmarch at the Congress at Göttingen.

A *résumé* of the methods of operation which have been suggested for the relief and cure of permanent closure of the jaws shows that they have been as follows:—

1st. Excision, more or less complete of the cicatricial bands or osseous formations, and the subsequent employment, for a long period of time, of wedges and levers to retain the separation of the jaws. Transplantation of mucous membrane to cover the surface of the wound as suggested by Dieffenbach, or transplantation of skin as practised by Jæsehe.

2d. Division of the cicatricial tissues, and the adaptation of metal shields, not only to prevent re-contraction, but to re-establish the sulcus of mucous membrane at the base of the alveolus.

3d. Dieffenbach's method of simple division of the ramus of the jaw—and a formation of a false joint *behind* the point of contraction.

4th. The formation of a false joint as originally suggested by Carnochan. Esmarch's suggestion that it be formed in front of the contraction, and that a segment of bone be removed for this purpose—by external incision.

5th. The formation of a false joint *in front* of the contraction by simple division of the bone, made by forceps applied within the mouth—Rizzoli's method. In closure due to ankylosis of the temporo-maxillary articulation, the methods practised are:—

1st. Division of the ramus of the jaw from within the mouth, either by saw, forceps, or chisel, and the formation of a false joint.

2d. Excision of the condyle with a portion of the neck, the incision being external.

A patient having presented herself to me for relief from permanent closure of jaws of long standing, due to cicatricial contraction, I had occasion to study the various methods of operation which had been proposed for this form, and became impressed, as the result of this investigation, with the fact that, objections more or less valid, could be urged against each,

and that it was possible to carry into execution successfully a method with the hope of securing better results. Moreover, in two cases I had failed by the plan of excision, and the use of levers to accomplish satisfactory results, and I had witnessed similar failures in others. The objections in cases of cicatricial contraction against the methods of operation above enumerated may be stated as follows:—

1st. Excision.—The re-formation of the cicatrix and the great pain to which the patient is subjected in the use of wedges, levers, and screws—the difficulties of securing flaps of mucous membrane and skin from adjacent parts and their successful transplantation. The almost universal failures.

2d. Division and Use of Shields.—The pain and inconvenience experienced by the patient in the use of the shields, and difficulty of obtaining the full coöperation of the patient in carrying out the necessary manipulations within the mouth.

3d. Division of the Ramus *behind* the Contraction.—Dieffenbach's Method.—The difficulty of obtaining a permanent false joint after simple section of the bone, and without division also of the overlying masseter muscle.

4th. Carnochan's Method as practised by Esmarch.—The loss of one-half of the jaw for the purposes of mastication, where excision is made in front of the contraction. Its inapplicability when both sides are affected, and the deformity which results.

5th. Carnochan's Method as practised by Rizzoli.—The difficulty in accomplishing the formation of a false-joint by simple division of the bone—the tendency to reunion being much greater than when a segment is removed.

Considering these objections I decided to operate upon my patient in the following manner: By division of the ramus of the jaw, about its middle, excision of the condyle and division of the insertion of the temporal muscle, thus releasing the coronoid process and effecting its removal with the condyle—division of the masseter muscle at its points of origin—non-interference with the cicatricial band. By this plan I hoped to secure sufficient space for free movement of the remaining portion of the ramus, and I proposed to utilize the cicatricial band as a *quasi* ligament, and obtain movement of the bone between this band and the internal pterygoid muscle. By division of the masseter at its point of origin, I proposed to relieve the tension of this muscle and more effectually prevent union of the divided fibres.

CASE.—The patient consulted me in January of this year (1883), and gave the following history of her case: She is now twenty years of age. Eighteen years ago, when two years and a half old, and then residing on the banks of the Brazos River in Texas, she sustained a gunshot wound of the left superior maxilla, the charge, medium sized bird shot, entering just below the inferior margin of the orbit.

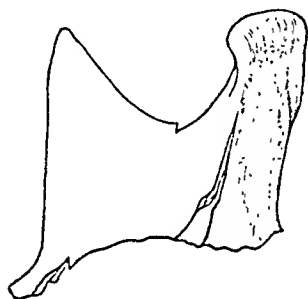
At the time of the receipt of the injury she was engaged in play on the porch of her dwelling, and the gun was discharged by a lad thirteen years of age, whose height compelled him to hold the weapon at an angle in taking direct aim at her head. This was done in play, the gun being presumed to be unloaded. The father, who was soon at her side, made efforts to check the hemorrhage which ensued, and sent immediately for the nearest physician, living some thirty-two miles distant. Late in the evening he arrived, "tired and cross," and declined to do anything, as he did not like to cause unnecessary pain, and as the child was sure to die. After a night's rest he returned home.

On examination it was found that the charge had entered just below the left orbit, comminuting the upper and fracturing the lower jaw as well, passed through the mouth and emerged below the left ear. The father in the hope of saving his child's life, continued his efforts to ward off fever and allay swelling by the administration of simple remedies, and the application of lint saturated in arnica. At the same time the mouth was forced open to cleanse it, but so great was the pain caused by the effort, that it was discontinued. The patient was unable to open the mouth for the purpose of taking nourishment, and finally all efforts were abandoned to effect the separation of the jaws, and soon they became firmly locked. At the expiration of a week following the accident, another physician was summoned, who removed some wadding, shot, and pieces of bone, and gave a very unfavourable prognosis as to the recovery of the child.

At the time of the accident the globe of the eye did not appear to be seriously injured, but the inflammation which attacked the parts and the cicatricial contraction which ensued in the closure of the wound, destroyed vision, and drew down the ball to such extent as to expose but a line of the iris, and produced a marked condition of ectropion. Soon the patient became accustomed to eat only soft food, which she learned to force between the teeth. The pressure exerted upon the teeth caused them to break, and the posterior teeth, which could not be erupted, became carious and gave pain.

A careful examination of the parts involved showed firm and complete occlusion of the jaws, absence of the two central and right lateral incisor teeth of the upper jaw, which had been worn away by the pressure made in rubbing pieces of food over them. Slight lateral movement could be obtained, showing absence of temporo-maxillary ankylosis. On passing the finger into the buccal cavity of the left side, a dense, rigid, cicatricial band could be felt extending from the molar region of the upper, to the molar region of the lower jaw. Eight to ten of the anterior teeth of the upper and lower jaws had fully erupted; the remaining were imbedded in the alveoli of the jaws, the edges of the crowns being seen in some instances. Just below the border of the orbit, on the left side, occupying the position of the upper portion of the canine fossa, there was a deep sulcus, lined by integument which had been drawn into it, and with it the lower eyelid; complete eversion of the lid having been produced, and the lower segment of the globe being constantly uncovered. This sulcus was caused by the entrance of the charge of shot. There was marked flattening of the entire left side of the face produced by the injury inflicted upon the structures, and the absence of subsequent full development. On the left side of the neck, on the upper portion, a few shot could be felt lying beneath the integument, and one was also felt beneath the mucous membrane overlying the left side of the lower jaw. Articulation was somewhat impaired.

On the 26th of January, 1883, I operated upon the patient in the manner above indicated, and with a view of relieving, by the one operation, the condition of ectropion. To accomplish this, I began the incision to the nasal side of the sulcus, carried the knife through it, and continued the incision along the lower border of the zygomatic arch to the tubercle at its base. I then dissected up the tissues from the bottom of the sulcus, and also from the anterior portion of the floor of the orbit, in order to release them completely, and thus replace the lower lid. Owing to the contraction which had ensued it was found necessary to divide this flap of tissue transversely, bring it into proper position, and secure the edges by a hare-lip pin. Continuing the dissection, I divided the fibres of the masseter muscle separating the entire origin, and then depressed it with the superjacent structures, thus very easily and completely exposing the coronoid process, the articulation and outer surface of the ramus to one-half its extent. With strong bone forceps I divided the ramus,



severed the ligaments of the articulation with the probe-pointed bistoury, then twisted out the articular head, and finally detached the insertion of the temporal muscle, removing the piece of the ramus which I exhibit.

Efforts were now made with wedges of wood to separate the jaws, but without success. On passing a probe between the jaws I found a strong osseous band which firmly united them; this I divided with the Adams saw, passing it between the imperfectly erupted teeth, and sawing from before backward. The wedges were again used, and the jaws separated to the extent of one inch between the processes at the position of the incisor teeth. The divided portions of the osseous band were then cut away with pliers and knife, and found to consist of a thin plate of bone.

On recovery from ether, the patient found no difficulty in opening the mouth, although it was accompanied by slight pain. In a few days the pain disappeared, and the mouth could be readily opened. Within three weeks after the operation twenty-one roots and partially erupted teeth were extracted, so as to fit the processes for the adaptation of artificial dentures. The incision was closed by four interrupted silver sutures, and dressed with lint saturated with carbolic oil. In order to assist in the exercise of separating the jaws, I employed daily for two weeks a mouth gag, which I devised some years since, and which works with a strong screw. In using it the patient complained of pain on the sound side, the structures of which had become somewhat rigid owing to long disuse.

At this time the patient is wearing a set of artificial dentures, which are retained readily in place, and which serve the purpose of mastication excellently well. The ectropion is relieved so that the globe is covered by the eyelids. Articulation is much improved. No tendency to re-contraction is observed. On the contrary, the patient states that her ability to open the mouth increases each day, and that she can separate the jaws to a greater extent than was done at the operation and without pain. Exact measurement gives the distance between jaws, when separated, as one and a half inches at the position of the incisor teeth.

Whilst in the present case the incision was made so as to relieve the ectropion as well as to uncover the joint and ramus, I should modify it but slightly in other instances, as it so completely exposes the parts, and does not involve either large branches of the facial artery or nerve, thus avoiding excessive hemorrhage or subsequent facial paralysis. It should begin at the middle of the lower border of the malar bone, and be carried outward in contact with this border and the inferior border of the zygomatic arch, to a point over the tubercle at its base; it is desirable to keep near the border of the zygoma in order to avoid wounding the duct of Steno, which lies a finger's breadth below.

So far as I am aware, the plan of operation suggested and practised is novel, in the fact that it includes removal of both coronoid and condyloid processes with the upper half of the ramus, as well as division of the masseter, external pterygoid, and temporal muscles, at the point of origin of the former, and the insertion of the latter. The advantages claimed over other methods are:—

First. Its application to all forms of permanent closure, that due to temporomaxillary ankylosis, as well as to cicatricial formations.

Second. The utilization of the entire body of the jaw in opening the mouth, not only affording in this way greater advantage in mastication and articulation, but serving to prevent deformity.

Third. The formation of a more perfect artificial joint in the removal of both processes, thus overcoming the resistance of the more or less fixed upper segment, when the joint is made either in the body or the ramus of the bone.

ARTICLE X.

REPORT OF A CASE OF ABSCESS OF THE LEFT ILIAC FOSSA, WITH SOME REMARKS. By LOUIS W. ATLEE, M.D., of Philadelphia.

THIS case is reported because it shows throughout its whole course the distinguishing and characteristic features of a phlegmon of the iliac fossa, together with some very rarely observed occurrences.

Mrs. H., *æt.* thirty-five years, native of Ireland; has been twelve years in America. Her father died of an acute disease of the lung (was perfectly well, when he took a bad cold and died in two days). Her mother died of consumption. Mrs. H. is of medium height, sufficiently well nourished, and of dark complexion; has been married two years, and has previously enjoyed good health. The husband is a robust labouring man.

On the 10th of March, Mrs. H. gave birth to a well-developed male child, still-born, after a labour of thirty-six hours. The physician attending used some force, but no instruments, in dragging the child away. She did not call it a hard labour.

The lochia stopped on the second day. Her breasts did not get hard or show any signs of containing milk; the nurse rubbed them with camphor and lard.

She did perfectly well for the nine days following delivery, getting up on the ninth day.

On the evening of the tenth day, after supper, which she had cooked herself, "a burning pain came into her hench;" it was in the left side, deep in the pelvis.

She was not too sick to be about on her feet, the pain at that time being in no way influenced by position, feeling always the same. In defecating or urinating, she had not the slightest trouble. There was no nausea or vomiting; she could eat, though she had no appetite.

Eighteen days after the pain began, a swelling appeared in the pelvis on the left side. This swelling reached as high as the crest of the ilium, but it did not extend near to the median line. After the appearance of this lump, the pain became frightful; the slightest motion or jar was agony; she could neither eat, drink, nor sleep, so that at the end of two weeks her condition was such that her life was despaired of. Through all this she was attended by a physician who looked upon the case as one of rheumatic affection of the hip-joint.

When my father first saw this patient, on the 23d of April, in consultation with the attending physician, her condition was considered to be an almost hopeless one. At that time, owing to inability to keep any but the one position upon her back, there was a bed-sore over the region of the sacrum as large as the palm of the hand. The thigh was flexed on the pelvis. To make life at all supportable, a quarter-grain of morphia was being given every two hours. Owing to the position of the patient, it was exceedingly difficult to examine her sufficiently to establish the diagnosis, but after considering carefully the history of the case as well as the local and general symptoms then manifesting themselves, a large tumefaction, with redness of the skin, in the left gluteal region was believed to be owing to a collection of pus that had found its way through the ischiatic notch out of the pelvis. A knife was introduced some three inches before the matter was reached. The quantity that came out was very great, but could not be measured, for the patient's position was such that it was impossible to collect it. For one week nothing was done but to endeavour to keep up the strength of the patient, and prevent her from dying. At that time, the pus seeming not to flow so freely as it had done at first, a drainage-tube was pushed some eight inches into the orifice.

When I first saw this patient, on the 3d of May, the lump in the left iliac region was barely perceptible; pus was being very freely discharged through the tube, and by pressure on the left gluteal region pus mixed with air gushed out.

Two weeks after the introduction of the tube, and while the pus was still flowing freely, she complained of soreness at a spot in the linea alba, midway between the pubes and umbilicus. A lump began to make its appearance there, which in two weeks was as large as an orange; it felt like an omentocoele, and could be all reduced into the abdomen through a hole in the linea alba that could admit the tips of three fingers. When on her side, the lump became larger, fuller, and more tense; when on her back, it was much smaller. My father looked at it and said it was a hernia. Nothing was done to it beyond continual poulticing, when nine days after its appearance, and while the woman was making some exertion,

it burst, giving exit to at least a pint of pus. The opening closed in a few days, the lump having entirely disappeared.

Seven weeks after the opening had been made in the hip, the fistula there had entirely healed. During this time she had hectic fever, which only ceased when the fistula closed. On one occasion (the 10th of May) she had three congestive chills, during which her lips were blue, and she shook as patients do only in the most malignant paludal fevers.

So long continued a suppuration brought about such a profound alteration of the functions of digestion and innervation that we almost despaired of re-establishing them.

During this long ordeal she was given iron, quinine, and morphia, any food she could eat, and malt liquors.

I saw this patient again on the 25th of June; she was very much stronger, being able to leave her bed. She ate well, but still had some pain, to relieve which a friend advised her to use laudanum (25 m.).

On the 26th of June, while lying quietly in bed, she felt a most importunate desire to go to stool, and before she could get up, a great quantity of pus came from the bowel. After this she felt very much relieved. Notwithstanding the presence of this large quantity of pus in the pelvis, she had no hectic, a good appetite, and was rapidly gaining strength. At this time the bedsore was nearly healed, but there was a hole in it that discharged greatly. This hole seemed to communicate with the interior of the pelvis, the pus coming from the same abscess that had burst into the rectum, much less pus coming through at the bedsore after the discharge from the rectum took place.

On the 29th of July they wrote me as follows: "I wish to let you know that sister Mary is getting better; her sores are nearly healed up, she is gaining strength, she takes no medicine at all, but she says that her hip feels stiff and heavy."

Previous to the publication by Grisolle, in 1839, of his monograph on "*Les tumeurs phlegmoneuses des fosses iliaques*,"¹ the various inflammations liable to give rise to collections of pus in the pelvis were much confounded. In this monograph, which is by far the best yet given to us on inflammations of the cellular tissue or phlegmons in the iliac fossa, he proves them to be independent of the pelvic serous membrane in their origin, and generally also in their course. When Bernutz and Goupil published their joint observations on pelvi-peritonitis, it was made clear that peri-uterine peritonitis may and does occur without any disease of the cellular tissue between the uterus and its serous membrane. The very existence of this membrane is denied.

The collections of pus that may arise from phlegmon of the iliac fossæ have been anatomically divided into two varieties, subperitoneal and subaponeurotic.

In the first variety, the phlegmon develops between the serous membrane and the fasciæ iliaca; in the second, the inflammation is to be found between the fasciæ iliaca and the anterior surface of the iliac muscle.

In the subperitoneal variety, the pus is rarely circumscribed, but is

¹ Archives Générales, etc., tome iv. p. 34, etc.

often much extended, the pus burrowing to a greater or less distance. When on the left side it has been known to burrow along the serous membrane lining the sigmoid flexure of the colon and the upper part of the rectum, arriving thus in the true pelvis; or, it may go upwards and reach the region of the kidney.

In the subaponeurotic variety, the pus occupies generally the internal iliac fossa; it is limited in front by the fascia iliaca, behind, by the iliacus muscle. The pus generally burrows to the front of the thigh in passing between the fibrous band that is placed outside the sheath of the femoral vessels and the anterior superior spine of the ilium.

The iliacus muscle is sometimes destroyed, the pus reaching the periosteum of the iliac bone; the psoas is also implicated, more especially its internal border. In the same way the quadratus may be destroyed. The fascia iliaca has entirely disappeared, or contracted very close adhesions with the peritoneum.

The iliac vessels and nerves bathed in the pus are softened, and if indurated spots exist, are compressed.

The migrations of the pus are sometimes very curious. Bérard cites a case of a woman who died of a pelvic abscess following labour; he found a vast collection of pus at the posterior and superior part of the left flank; it had extended itself outside of the peritoneum, between the iliac fossa and the intestine, had passed into the right iliac fossa by separating the peritoneum in the hypogastric region; it ascended from thence along the median line to the umbilicus, and there found its way out.

The exit the pus will make depends greatly upon whether it came from a phlegmon of the first or second variety.

In the first variety, it is most often seen in the lower part of the belly, a little above the crural arch.

In the second variety, the pus following and burrowing under the fascia iliaca will follow the sheath of the psoas and iliacus to arrive at the trochanter minor.

In either variety the abscess may evacuate itself by some of the viscera contained in the pelvis.

A case is mentioned in which the pus evacuated itself through the uterus. It was from an abscess of the left iliac fossa following child birth.

The pus following the fibrous sheath of the iliacus and psoas muscles has invaded the coxo-femoral joint, destroying the fibrous capsule, the head of the femur coming out of its cavity. This occurrence can be explained thus: As the pus follows the psoas and iliacus tendons, it may pierce their common synovial sheath, which communicates with that of the hip-joint.

The pus from these abscesses being found beneath the glutei muscles is anatomically thus easily explained by Jarjavay (*Anatomie Chirurgicale*, vol. ii. p. 615, F.). "Beneath the gluteus maximus and its deep fibrous sheath is a layer of cellular tissue, very loose, and more or less covered

with fat. It communicates, by the great sacro-sciatic notch, with the subperitoneal cellular tissue and that of the broad ligaments, and below with the same of the crural region. It results from this that a deep abscess of the buttock may spread to the upper part of the thigh, and that a phlegmon following ligature of the gluteal artery can extend into the pelvis."

In Velpeau and Bérard's *Manuel d'Anatomie Chirurgicale*, the same explanation is given.

These abscesses may terminate fatally by bursting into the peritoneal cavity.

The causes of these iliac phlegmons are very obscure. They are common after labour, more especially in primiparæ. Grisolle could not say that difficult labour, manual or instrumental interference had any effect in their production, but he supposes that it is more common in primiparæ than multiparæ, because they generally have longer labour. He states, particularly, that diffused phlegmon, vast suppurations of the pelvic cavity frequently follow much handling and unskilfully used forceps.

Velpeau saw a phlegmon of the left iliac fossa follow inflammation of that synovial capsule which covers the horizontal ramus of the pubis to facilitate the sliding of the psoas and iliacus muscles. The same professor saw a suppurating syphilitic bubo give rise to inflammation in the left iliac fossa by continuity of tissue.

Grisolle states very decidedly that "nothing would authorize writers to say as they do, that the annexes of the uterus, and, in particular, the broad ligaments, were the origin of iliac phlegmons following labour."

These phlegmons have been confounded with pelvi-peritonitis, and in their commencement with pelvic cellulitis. When the pus has extended itself about the pelvis the diagnosis from pelvic cellulitis is impossible as well as useless. When a pelvi-peritonitis is so mild as to give rise to symptoms analogous to those of iliac phlegmon, the swelling does not rise above the brim of the pelvis, nor does it reach to the iliac fossa, and it is clearly appreciable in one or more of the vaginal cul-de-sacs. When distinguishable in the hypogastrium, which is a very rare occurrence, it is only at the last when the swelling has increased by successive attacks in the hypogastrium. Phlegmons are distinguishable from the beginning.

The tumour produced by pelvi-peritonitis does not give the resistance, elasticity, and hardness that we find in phlegmonous tumours, but gives a peculiar feeling of softness from the very beginning.

In phlegmon there is little fever or disturbance of the digestive functions in the beginning, whereas, in pelvi-peritonitis there is vomiting, diarrhoea, and high fever, etc.

In pelvi-peritonitis there is no retraction of the thigh.

Collections of stercoraceous matter in the bowel, and masses of intestine, united by false membranes, have been mistaken for an abscess of the iliac

fossa, but such mistakes are hardly possible to a competent practitioner of medicine.

These brief remarks are appended to the history of this case, because in no work in the English language, to our knowledge, are phlegmons of the iliac fossa distinguished as clearly as I believe they should be from other inflammatory affections in that region.

ARTICLE XI.

CLINICAL OBSERVATIONS UPON OTORRHŒA (CHRONIC PURULENT OTITIS MEDIA) WITH PERFORATIONS OF THE MEMBRANA TYMPANI.¹ By READ J. MCKAY, M.D., of Wilmington, Delaware, Member of the American Otological Society.

HAVING treated during the past eleven years 230 cases of otorrhœa, or, more technically, chronic otitis media with purulent discharge, I have concluded to present for consideration some clinical observations upon such cases with old perforations of the membrana tympani, and endeavour to show that they are not the unsatisfactory and irremediable class of aural diseases which they have long been regarded, and perhaps still are, by many general practitioners as well as the public generally.

And because of the well-known dangers from caries and necrosis of the temporal bones, meningitis, cerebral abscess, and purulent infection, which sooner or later may, and often do ensue, when they are disregarded or neglected, they should not in the future, as in the past, be permitted by physicians to pass from under their observation without any or carelessly directed local and medical treatment.

I shall carefully exclude from consideration at this time all cases of acute otitis media with recent perforations of the membrana tympani, which are the usual beginnings of the *chronic* cases I propose to analyze and present for consideration, as well as their later grave and dangerous sequelæ, of bone, meningeal, cerebral, or septic disease.

One hundred and seventy-six of the two hundred and thirty cases of otorrhœa (chronic purulent otitis media), about three-fourths of the entire number, were treated at the Out-door Department of Bellevue Hospital, New York City, during the five and a half years intervening between March, 1872, and August, 1877, and sufficiently full notes were not recorded of their exact condition and progress under treatment, to state definitely how long they were treated and with what results. All of them, I well

¹ Read before the Delaware State Medical Society, at its annual meeting held in Wilmington, Del., June 12, 1883.

remember, were more or less benefited, many of them I feel sure were improved, and a small unknown number permanently cured.

Recent examination of my private case-books shows that of the 54 recorded cases 25 have such full notes as to enable me to state quite definitely how long they were treated and the results of the treatment.

It was recorded that 24 of the 176 hospital cases had old perforations of the "drum membranes;" the remaining 152 cases had no recorded notes as to those common complications.

The 54 private cases recorded had 49 old perforations, and several others are supposed to have had, but they were neither noted nor counted.

The frequency of the perforations found in the more carefully recorded cases shows how commonly they occur with chronic purulent otitis media.

In 57 of the cases, perforation of the membrana tympani was found upon one side only.

In 14 of the cases, perforation existed upon both sides.

3 " 73 cases had 2 perforations in one drum membrane.

1 " " " 3 " " " " " "

The usual local complications due to the irritating character of the purulent discharge, such as the various forms of inflammation of the external auditory canals, aural polypi, and polypoid granulations upon the "drum membrane," were not always noted, and will not especially engage our attention.

I shall present brief histories of the 25 fully recorded cases, so that we may learn their etiology, duration, condition, and the results of the treatment they received.

CASE I.—In the spring of 1873, Mrs. S., aged 30, a resident of New Jersey, was treated for chronic purulent otitis media with old perforations of her drum-membranes, which she had had for years. Her hearing was impaired. She frequently experienced more or less discomfort and pain in and about her ears. She was carefully treated, and within two months' time the perforations were healed, her discomfort relieved, and hearing greatly improved, and these improvements continued more than five years thereafter, the last report received of her condition.

CASE II.—In February, 1874, Thos. F., aged 32 years, native of England, an engineer, reported that at 12 years of age his left ear began to discharge. Two years afterwards a polypus was removed from it in a London Hospital, and for two years thereafter he had very little discharge. Then it gradually became more and more profuse from year to year. His hearing became so impaired he had to change his work from a boat to the care of a stationary engine. For the past five or six years he could not hear his watch when pressed against his left ear. With his right ear he could only hear his watch fifteen inches, and it had been discharging five or six months.

A large polypus was found filling the left meatus. It was removed by Wilde's snare, and its remaining adhering pedicle was removed by local caustic applications. Perforations were found in both drum-membranes. After five-and-a-half months' treatment, each ear could hear his watch three feet. The discharge had ceased some time previously, and the per-

forations had healed. In September, 1875, he reported his hearing remained very good, and that he had no discharge from his ears.

CASE III.—October 2, 1878, J. W. L., a schoolboy, aged 18, stated his left ear had discharged more or less since he had the measles when four years of age. With it he could hear a watch pressed against the ear, and the loud voice. After cleansing the left ear by syringing with warm water and drying it with absorbent cotton, several extensive and old perforations and slight granulations of the drum membrane were found. About three months previously he got water in his right ear whilst sea-bathing, causing some deafness and tinnitus. It could hear the watch ten to eleven inches. No purulent discharge was found in it but a recently formed perforation of the "drum membrane," which healed in four days' treatment and gave no further trouble. Within four months the perforations and granulations of the left ear healed, and remained so several years after, the last report from him. His hearing, which had been promptly improved, had continued very satisfactory, and had caused him little or no annoyance.

CASE IV.—April 5, 1879, B. H., a boy aged 7 years, was first examined. His mother stated that his right ear began to discharge when he was six months old, and had done so from time to time since. That it was always more profuse when he had a cold, from which he was rarely free. He had naso-pharyngeal catarrh verging upon ozæna. At night he has been suffering with earache of his left ear, due to subacute aural catarrh. From his right ear there is a profuse purulent discharge. After cleansing it a large perforation of the drum-membrane at and below its centre, one-third of the size of the membrane, was found. His general health was greatly impaired, and received prompt attention as well as his ears. The left ear promptly improved, and the right rather slowly but satisfactorily. The discharge ceased in a few weeks, and the hole in the drum-membrane diminished more than one-half of its size. He was not treated so often as desired because of his unusual timidity, and during the summer he was absent from home, but no discharge was observed. When he returned in the early autumn the perforation was still smaller, and it subsequently healed. During the winter cold-taking caused it to reopen, but it again healed after a few weeks' treatment. For more than three years past he has not experienced any annoyance from his ears.

CASE V.—September 20, 1878, Sarah W., a school-girl aged 15 years, was examined, and aural polypi were found nearly filling her left meatus. They were destroyed by a few applications of chromic acid and a large central perforation of the drum-membrane was revealed. It rapidly diminished in size under treatment, but never entirely closed whilst under observation, a period of four months, because of irregularity of visits for treatment and neglecting daily directions at home to try to remove the discharge.

CASE VI.—September 26, 1879, C. J., aged 38 years, reported that when a child he had scarlet fever, which affected both of his ears. They have discharged more or less ever since—the right ear a purulent, and the left one a serous, exudation for years past. The hearing of the right ear was so very much impaired that he relied upon the left one almost entirely, and with it he did not hear well. He "never had pain in his ears." Examination manifested that the right drum-membrane had disappeared except a very narrow rim of its marginal attachment, which was broadest at its upper edge, and there existed a large central perforation of the left

membrane. Under treatment the latter diminished to one-half of its size in a few months, and has remained so. The right drum-membrane began to re-form by growing from its entire margin, and in June, 1880, a thinly prepared and moistened cotton artificial drum-membrane was first introduced to cover the perforation, and it has been worn ever since. It immediately improved his hearing. It requires to be renewed once a week or oftener, which he has learned to do for himself. The right drum membrane has almost entirely re-formed, and now only a narrow, central, vertical-shaped opening exists. The hearing of his right ear has greatly improved for all kinds of sounds, both with and without the artificial "drum," and he does not now use it constantly. For a year past he has worn the same kind of cotton artificial drum membrane in his left ear also, with considerable benefit to its hearing. The improvement in his condition gives him great satisfaction and comfort. If he experiences any irritation in his ears from cold-taking or from wearing the artificial "drums" too long, which cause a purulent discharge, they are removed, and the use of finely powdered boracic acid at night promptly checks its formation. The "drums" are worn the next day.

CASE VII.—October 4, 1879, S. B., a little girl aged four years, was first examined. She had a profuse and offensive otorrhœal discharge from her right meatus which had existed nine months. Almost her entire right drum-membrane was destroyed. Her hearing was impaired. She had inflammation of the left external auditory canal and chronic aural catarrh of same ear. She had chronic naso-pharyngeal catarrh. The discharge was soon checked and the large perforation began to diminish, but it did not close entirely. Her hearing and general condition were decidedly improved in a few months, and remained so for a year or longer, when she relapsed from cold-taking. In less than a week she was again relieved. During the past winter she had a similar experience. Again, about a month ago, she relapsed during an attack of measles, and the discharge was relieved by one visit and within a week. The perforation is still unhealed.

CASE VIII.—Frank P., an orphan, between 3 and 4 years of age, an inmate of the "Home for Friendless Children" of this city, was deaf and dumb when admitted. Could not learn his early history. My attention was called to his "running ears," which had existed previous to and since his admission to the "Home."

October 15, 1879, his ears were cleaned and examined carefully. Three perforations were found in his right drum-membrane and a large one in the left, which had destroyed two-thirds of its lower anterior portion. He did not seem to hear or notice any external noise, but smiled and gave evidences of perceiving the musical sound of a vibrating tuning-fork placed upon his forehead, which indicated that his auditory nerves and internal ears were probably not diseased and did not cause or complicate his deafness. He did not speak at all. When at play with other children would very rarely make an indescribable noise. He had chronic naso-pharyngeal catarrh. After a few weeks' treatment he began to hear and to talk in monosyllables, and later to yell and to sing, which he now does the same as his playmates. The perforations of the right membrane healed one at a time during two years under caustic treatment, but reopened several times "when he took cold." For the past year and a half, under the boracic acid treatment, they have remained permanently healed notwithstanding cold-taking. The large hole of the left drum-membrane has grown gradu-

ally smaller under similar treatment. It is now a narrow vertical opening which promises to close soon, judging from the progress it has made in healing during the last nine months.

CASE IX.—M. W. B., a young man 18 years old, was referred to me by Dr. Bush, in June, 1880. He reported that six or seven years previously he had measles which affected his ears, causing a great deal of pain for a long time, but none the past three or four years. That he had had a discharge from his right ear for more than four years, and it had become very offensive during the past three months. For nine months he had been greatly annoyed by a dry, painful naso-pharyngeal catarrh. He was debilitated, and apprehended pulmonary disease. With his right ear he could hear a watch one inch, with the left ear three and a half inches. Required to be spoken to in a loud voice to hear distinctly. He had chronic aural catarrh of his left ear. Small polypi were found in his right meatus attached to its walls and within the tympanic cavity. They were removed with Blake's aural snare and the remnants touched with chromic acid. Two perforations were found in the right drum-membrane. Within two months his hearing was greatly improved, the polypi removed, and the perforations healed. His naso-pharyngeal catarrh was also much benefited. In the fall of 1882, two years after treatment, his mother reported that his ears had remained continuously well, and he had greatly improved in his general health.

CASE X.—September 25, 1880, R. P. B., a school-boy, aged 13 years, was brought for examination of his right ear, which was discharging profusely. When two years of age, he had measles, and his right ear discharged for one-and-a-half year thereafter continuously, and then only at intervals. Three years ago it returned. One year ago it discharged blood, and again one week ago. Hearing of both ears was impaired. The left one less so, and it is due to chronic aural catarrh. The right drum membrane was found to have two large oval perforations in it, situated before and behind the long handle of the malleus attachment. The discharge was considerably checked in a few weeks, and the perforations began to heal all around their margins, and after six months' treatment they were only one-half of their former size. His hearing had improved somewhat. The discharge did not recur for some months, until after taking cold. In December, 1881, the dry boracic acid treatment promptly checked the discharge, and the perforations began to diminish again. In the fall of 1882 his mother was instructed how to introduce the cotton artificial "drum," to be renewed once a week or oftener. Its use greatly improved the hearing of his right ear when covering the perforations. He still continues to wear it with much improvement of his hearing. The perforations were about one-third of their original size a few months ago.

CASE XI.—J. E., a tobacconist, aged 46, was first examined March 24, 1881. He stated he had had trouble with his ears since boyhood, and they were usually worse in March. His hearing was impaired, and he often had pain in his ears. After removing impacted wax and epithelium it was found he had inflammation of the external auditory canals, and old perforations of his drum-membranes. After three weeks' treatment they healed, and his condition was greatly improved in every way. About eighteen months afterwards he had a slight relapse of soreness and deafness, and was relieved by one visit in which his ears were cleansed and powdered boracic acid was used.

CASE XII.—A. L., a boy, aged 7 years, was first examined July 2, 1881. He had scarlet fever one-and-a-half year previously, since which time his left ear has discharged more or less. His hearing was somewhat impaired. Granulations were found upon his left drum membrane, and one perforation of it larger than one-eighth of an inch in diameter. The former disappeared after a few weeks treatment, and within three months the perforation healed. His hearing was decidedly improved. He had a slight relapse of otorrhœal discharge from "cold-taking" in the fall of 1882, which a few days' use of powdered boracic acid checked, and soon re-established a healthy condition of his ear.

CASE XIII.—F. J. B., a farmer, aged 30 years, reported, October 3, 1881, that before he was six years old he had scarlet fever, which affected his ears, causing deafness, pain, and discharge. For several years past he has experienced periods of getting better and worse, which were very annoying. He has chronic naso-pharyngeal catarrh, and takes cold often and easily, which always dulls his hearing. He has chronic aural catarrh of his right ear, and small aural polypi with perforation of membrannum tympanum of his left ear. He was considerably improved by a few treatments, of several weeks' interval, the polypoid granulations removed, and the perforations healed within two months. He had slight relapses in the spring and fall of 1882, which were promptly relieved by one visit each time. He received directions about local and constitutional treatment to be employed at his home.

CASE XIV.—J. L., a young woman of 19½ years, reported, October 22, 1881, that she had scarlet fever seven years ago, which affected her ears. One year ago she became somewhat deaf. The last month it has grown worse, and she is greatly annoyed by tinnitus aurium. She had chronic aural catarrh of her left ear, and an old perforation of the right drum membrane. Her hearing was greatly improved at once, and in a few weeks the perforation was healed. She remained so months afterwards, the last heard from her.

CASE XV.—Miss S. S., aged 20 years, reported, October 29, 1881, that ten years previously she had ear trouble with the measles. That the right ear pained and discharged at irregular intervals for four years afterwards. She has nasal catarrh, and periods of deafness, lasting a few weeks, usually whenever she takes cold, which occurs irregularly several times a year.

Examination revealed chronic aural catarrh of left ear, and otorrhœa of right, with perforation of its drum membrane. Three visits to the office to receive treatment greatly benefited her in every way, and in less than a month, her ears were well, and remained so more than a year afterwards, I was informed.

CASE XVI.—December 12, 1881, M. C., an unmarried woman, aged 28 years, reported that she had been deaf 9 or 10 years, and lately she had had considerable tinnitus. Her hearing was very much impaired. She has chronic aural catarrh of her right ear, its drum membrane very markedly opaque, thickened, and sunken. Her left ear contained purulent discharge, and a large perforation of its drum membrane was found, only a narrow rim of its margin remaining. Granulations covered the inner tympanic wall. She had chronic naso-pharyngeal catarrh and hypertrophied tonsils. Her hearing was slightly improved at once. Three weeks' treatment greatly improved her condition in every way, checked the discharge, healed the granulations, diminished the size of the perforation,

and decidedly increased her hearing. About a week ago I was informed her relief had continued permanent and very satisfactory.

CASE XVII.—Miss G. C. H., aged 12 years, reported, July 12, 1882, that her right ear has been affected more or less since she had scarlet fever when five years old. The ear discharges and is often painful. She catches cold often and easily, which usually decreases her hearing. Removed an excess of dry wax from both ears, and found a perforation of the left drum membrane, and granulations upon the right membrane. Within five weeks her ears were well, her hearing satisfactorily restored, and no relapse has been reported.

CASE XVIII.—G. M. S., a school-boy, aged $14\frac{1}{2}$ years, was first examined July 13, 1882. His deafness makes it difficult for him to attend school. His ear trouble began two years ago. His mother thinks it is due to excessive bathing and diving. He has considerable earache. Both ears discharge, alternately and together. The left one now doing so. The right one was found occluded with epithelium and wax. Both drum membranes were perforated, the hole in the right one much the larger, and more than half of its membrane had disappeared. His hearing was promptly improved, and the discharge checked in a few days. Within four weeks the perforations were considerably diminished. The smaller one of the left ear subsequently closed, the larger one of the right did not entirely. For eight months past he has not had sufficient discomfort to seek further advice.

CASE XIX.—Miss T., aged 17 years, reported August 29, 1882, that seven or eight years previously she had scarlet fever, and her ears were affected. During the last two or three years her left ear has discharged pus profusely and occasionally blood, and it has pained her more or less. Her hearing is considerably impaired. Examination detected chronic aural catarrh of her right ear, and aural polypi nearly filling the left meatus, which was partially removed with Blake's aural snare. Boracic acid was packed in the ear and within ten days the polypi had completely disappeared. Then a perforation of the drum membrane was found, which healed within two weeks under the same treatment, and remained so two months longer when she was last examined. Her improved hearing was satisfactorily maintained, and she had no relapse up to two months ago.

CASE XX.—R. H., a school-boy, 17 years of age, reported September 24, 1882, that about four years ago he had scarlet fever which affected his ears, causing them to discharge, and they have continued to do so more or less from time to time ever since. He has considerable dulness of hearing. Hears best with his left ear. The right one rumbles and has bled twice. Examination detected several large polypi filling the right meatus. They were removed with Blake's aural snare, and found attached within the tympanic cavity. Chromic acid was applied to the undetached roots of the pedicles. A large perforation, which had destroyed the lower two-thirds of drum membrane, was observed. A smaller perforation of the left drum membrane was found. Boracic acid was packed in both ears. The discharge soon ceased. He improved rapidly in hearing, the holes diminished in size, especially the longer one, and he experienced marked relief within three months. He was treated several times a week for two months, then once a week about same length of time, and afterwards once a month a few times. He had two relapses of otorrhœal discharge from cold-taking, which were relieved by one or two treatments. He continues comfortable and greatly improved.

CASE XXI.—J. L. P., a school-boy, aged 18 years, was brought to my office, Nov. 11, 1882, for examination. He has had chronic naso-pharyngeal catarrh for some years past, greatly obstructing his nasal breathing, and his ears have (within the last few years several times a year) been affected with deafness, occasional earache, and slight discharge. Found subacute aural catarrh of his right ear, and eczema of external auditory canal of his left ear, with a small perforation of its drum membrane. His hearing was promptly improved and maintained by successive treatments. The discharge was checked within two days, and the perforation healed within a week. His nasal catarrh slowly but steadily improved under compressed air, atomized fluid applications, and internal medication. He has had several slight relapses from cold-taking. His condition has been greatly improved in every way.

CASE XXII.—O. P. B., a young man of 19 years, reported December 28, 1882; he had had "running ears" when a baby, and occasionally since. He has earache often. Has been more or less deaf for some years, which increased last summer after sea-bathing. Examination revealed chronic naso-pharyngeal catarrh, and chronic aural catarrh of both ears, with slight discharge in the left one and a small perforation of its drum membrane, which healed in a few days. His condition was somewhat improved in two weeks, which was all the time he could be treated, and I have been informed it has continued.

CASE XXIII.—E. B., a boy of 13 years, presented himself February 24, 1883. His ears began to run five years previously. First one discharged and then the other, and it always increased when he had a cold, which occurred frequently. Never has any pain about his ears. His hearing was very defective, requiring to be spoken to in a loud voice generally, and it is worse when he has a cold. After cleansing his ears large central perforations of both drum membranes were detected with polypoid granulations upon the membranes, and attached also to the deep portions of the external auditory canals. Powdered boracic acid was packed in both ears, filling the meati. It was to be used at home as soon as the discharge was manifest again. Four days later, his second visit, the discharge had ceased and the holes were healing. Politzer's method of inflation greatly improved his hearing. The case progressed favourably and rapidly. Within two weeks all granulation tissue had disappeared. The perforations were healed to the size of pin-points at his last visit, seven weeks from beginning of treatment period. He has not reported since, which he promised to do if any further trouble was experienced.

CASE XXIV.—Miss B., aged 19 years, reported March 20, 1883, that her ears discharged for a time in infancy and again ten years ago, when she had scarlet fever; also they have continued to do so more or less ever since, either alternately or simultaneously, and they are worse when she catches cold, which she often does. She has considerable tinnitus and dulness of hearing. Has chronic nasal catarrh, which annoys her very much and prevents her sleeping well. Examination manifested large perforations of both drum membranes of unequal size, with granulation tissue upon them. Packed boracic acid checked all discharge in a few days, destroyed the granulations, and the holes began to diminish in size. Her hearing was promptly benefited, and it has become much better. The smallest perforation closed within four weeks, the larger one has not closed. Her nasal catarrh has nearly disappeared, and she sleeps better than she has for years past. In eight weeks she has been greatly benefited in every way, and it promises to continue.

CASE XXV.—Miss C., aged 16 years, reported March 21, 1883, that between five and six years of age she had whooping-cough, and shortly after her ears “gathered and run,” which has continued more or less ever since. They are worse in the winter when she catches cold. They often pain. Her hearing is considerably impaired. Has chronic nasal catarrh. Examination detected perforation of both drum membranes with granulations upon membranes. Packed boracic acid in her ears, which checked the discharge within three days; the granulations began to disappear and the perforations to diminish in size. Her hearing was quickly somewhat improved, and it has continued to grow better. She progressed favourably and rapidly, notwithstanding a slight relapse from cold-taking. In eight weeks all granulations had disappeared and the perforations were closed. She was recently under observation for examination.

A short recapitulation of the results and methods of treatment will, I think, be interesting and striking.

In 17 of the 25 cases fully reported, the perforations of the drum membranes were healed, viz: Nos. 1, 2, 3, 4, 9, 11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, and 25.

In 4 other cases in which perforations existed in both ears, viz: Nos. 8, 18, 20, and 24, they were healed in one ear and were not in the other.

In the remaining 4 cases, viz: Nos. 5, 6, 7, and 10, they were not healed, but the discharge was checked, the perforations diminished in size, and their hearing was greatly improved; in fact, their condition was in various ways more or less ameliorated and rendered much more comfortable.

The first 15 cases were treated by various caustic applications, and they required usually several months' treatment to relieve or cure them.

The remaining 10 cases were treated with finely powdered boracic acid packed in their ears, usually filling the meati the first few visits, which generally checked the purulent discharge in a few days, and only required several weeks (usually about four) to relieve or cure them.

The latter treatment (known as the dry method), besides its great saving of time, is painless, and the only objection patients make to its use is, that it renders them more deaf for a few hours immediately after its introduction. But as it is only for the first few applications (until the discharge is checked), they submit after explanations that it will be merely a temporary inconvenience.

The 25 cases were selected to be reported because full notes were made of them from the beginning to the end of their treatment.

The remaining 29 cases of the 54 private cases were omitted because pressure of business prevented full notes being made of their progress under treatment, and I feel confident that their average of relief or cure compares very favourably with those detailed.

ARTICLE XII.

A MODIFIED PORRO-CÆSAREAN OPERATION: THE PEDICLE DROPPED IN.
By PAUL GROSSMANN, M.D., of Omaha, Nebraska.

ON Sunday, May 7, 1882, I was called to attend, in her first labour at term, Mrs. Louise Cuneo, a rachitic dwarf, 23 years of age, and measuring four feet one inch in height. The waters had broken before her pains began, and at my visit, her pulse was 72, and temperature $98\frac{1}{2}^{\circ}$. I was informed that the patient was one of eight or nine children, born of sound, healthy German parents, whose four sons were well built, whilst all their daughters were like this one, rachitic.

I found, upon examination, that the arms of the patient were short, and presented the usual rachitic appearances. Her right lower extremity was of the shape of a long S, and the patella looked outward, notwithstanding which, the leg could be placed at nearly a right angle with the thigh, and the foot, in standing, rested with its plantar surface upon the floor. The left leg was not so much deformed, and both tibiæ presented the evidences of disease, in the fact that there was a convexity of these bones in their lower third.

On examination of the pelvis, it was found to be asymmetrical, and contracted in all its diameters, but chiefly antero-posteriorly. The lower conjugate, or the *conjugata diagonalis*, was found to measure about three inches; deducting $\frac{3}{4}$ of an inch, would leave the antero-posterior diameter of the superior strait at $2\frac{1}{4}$ inches. The lumbar vertebrae were found to retreat very abruptly from the promontory of the sacrum. The coccyx projected forward in the characteristic hook form often seen in rachitic women. The os was undilated.

During Monday, the pains were rather strong, and the patient was given occasional doses of opium. Monday night they became still stronger, and $\frac{1}{4}$ of a grain of morphia was given hypodermically, and two more doses of $\frac{1}{4}$ of a grain each by the mouth at 1 and 7 A. M. Tuesday. At this time there was only sufficient dilatation of the os to admit the tips of two fingers. During Monday the patient's pulse was about 100. On Tuesday it gradually increased, till it had reached 144 at 10 P. M. The waters had entirely drained away by Tuesday morning.

On Monday and Tuesday the question of forcible delivery had been presented to the family, and they were informed as to the operations of craniotomy, Cæsarean section, and the Porro operation. They delayed their decision, but finally consented to the performance of craniotomy, refusing to allow her to be removed to the hospital, or any other more convenient place. In order to secure better dilatation of the os, at 4 P. M. Tuesday, the patient was given ten grains of hydrate of chloral, and three of quinia, and this dose was repeated every thirty minutes for three doses, and every hour for three more.

At 10 P. M., after the long delay, it was seen that the patient's strength was declining, and it was deemed essential to operate at once. Much valuable time had been lost in an effort to secure permission for the performance of abdominal section, which was persistently denied; finally, I under protest undertook to perform craniotomy. The os was now found more dilated and easily dilatable with the fingers. The child was still living and found to be in the first position of the vertex. I applied the

craniotome to the right parietal bone, and found no trouble in perforating it. As much as possible of the brain substance was removed with the aid of an elastic catheter, and parts also of the frontal, parietal, and occipital bones. I then attempted podalic version with the right hand, passed in on the left side of the pelvis; my hand was passed through the pelvis with great difficulty, and when forced far enough to engage the upper third of the forearm in the pelvis, it was compressed so tightly that it was impossible to flex the fingers; the hand reached the child's right knee, but I was unable to grasp it, or go further, and the combined pressure of the narrow pelvis and the uterine contractions were unbearable and required the instant removal of the arm. After a few moments' rest, I made another attempt at version with the left hand, passed in on the right side of the pelvis. On account of the asymmetrical character of the pelvis, this was found still more difficult, and the hand could not be inserted as far as the knee. Two more attempts were made with the right hand, and one more with the left, but it was impossible to grasp the child's knee, or reach its foot.

The uterine contractions were now so violent that rupture of the uterus was imminent; the patient had been profoundly anæsthetized for nearly five hours; meanwhile, subjected to craniotomy; and I felt that it was useless to prolong the attempt at embryotomy, and, after a brief consultation with other physicians present, I decided to insist upon abdominal section as the only possible means of saving the mother, and to perform the Porro operation, so that, if the patient lived, future impregnation would be impossible. She had then been in labour sixty-six hours, and her pulse ran from 140 to 144 per minute.

The family now yielded to my demand, and I made an incision from two inches above the umbilicus, almost to the symphysis pubis; the opening of the abdominal cavity was made without difficulty, or the necessity of applying a single ligature. The small intestines and the omentum protruded and were replaced.

I made an incision eight inches long in the uterus; seized the legs of the child, a good-sized boy, and removed it; fortunately, the placenta was attached to the posterior uterine wall. The uterus was then lifted out of the abdominal cavity, and eight ligatures were applied in the right broad ligament; a curved needle armed with a double silk ligature was passed through segment after segment of the ligament and each one tied as soon as passed. An incision was then made from the long incision in the uterus, but at right angles to it, almost to the ligatures across the broad ligament, and one-half the uterus just above the internal os was separated by scissors from the part beneath; six ligatures were similarly inserted in the left broad ligament; another right-angle incision was made nearly to these ligatures, and by means of the scissors the complete removal of the uterus above the internal os was made.

The uterus, Fallopian tubes, and ovaries were then removed. An exceedingly small quantity of blood was lost during the operation.

Six sutures were then inserted in the uterine stump, and a perforated elastic catheter was inserted through the abdominal wound, stump, and vagina for drainage. The ends of the ligatures were cut off, the stump returned to the cavity, and this thoroughly sponged out. The operation was performed without spray, or other antiseptic preparation.

An examination of the pelvis showed that the antero-posterior diameter of the superior strait was only two inches, and the pelvis very asymmetrical.

The abdominal incision was then closed by ten ligatures, with careful approximation of the peritoneal surfaces. The wound was dressed with lint moistened with carbolized oil, and the patient bandaged and removed to her bed; she now became conscious and asked for her child. She was given some stimulant and a hypodermic injection of morphia; she conversed a little and fell asleep. Her pulse at the conclusion of the operation was 128, but as soon as she emerged from the anæsthesia it began to intermit, losing every tenth beat, for an hour and a half.

At 6 A. M., her pulse was 128, and respiration 28. At 8 A. M., her pulse and respiration were the same. During the day she was given nourishment and stimulants which she retained, and was kept under the influence of morphia. At noon her urine was withdrawn by catheter, and some tympanites was discovered. More morphia was given at this hour, and the patient expressed herself as feeling better and hungry. At noon her pulse was 132, respiration 24, temperature $98\frac{1}{2}^{\circ}$. At 5 P. M., delirium was present, the tympanites more marked, and the pulse was fluttering; stimulants were now pushed. At 7.45 P. M. she was pulseless, and fifteen minutes after this, died—fourteen hours after the operation.

I feel confident that the above operation would have been a successful one if performed at the very beginning of labour.

ARTICLE XIII.

EXPERIMENTS IN THE USE OF NAPHTOL FOR THE TREATMENT OF SKIN DISEASES. By ARTHUR VAN HARLINGEN, M.D., Professor of Skin Diseases in the Philadelphia Polyclinic.¹

NAPHTOL was first brought to the notice of the profession by Professor Kaposi, of Vienna, about two years ago² as a sort of substitute for tar and its preparations. The substance used by him is the β naphthol of chemistry, a derivative of coal tar which occurs in commerce as an indistinctly crystalline substance of a dusky mulberry colour, semi-transparent, and resembling coarse rock salt.³ It has a faint odour, slightly like that of coal tar, but at the same time aromatic. Its chemical constitution is said to be represented by the formula $C_{10}H_8O$. It melts at 122° C. and boils at 290° C. It is soluble in an equal weight of alcohol, very slightly so in water, but readily in alcohol and water. It is also soluble in fixed oils and fats. In solution and ointment its odour is scarcely perceptible. In thin strata the preparations of naphthol are colourless; after long exposure to the air they become red. They do not stain the skin or hair, and do not usually discolour linen or other dressings. The solution

¹ Read before the American Dermatological Association at its seventh annual meeting, Lake George, August 30, 1883.

² Wiener Med. Wochenschrift, Nos. 22 and 23, 1881.

³ More recently a recrystallized naphthol, in fine gray pearly scales, has appeared in the market.

and ointment of naphthol were at first used by Kaposi in various strengths, from one quarter to ten per cent., or even higher.

A later communication from Kaposi¹ gives the result of further and more extensive experience with naphthol. He had treated up to that time about a thousand cases of skin disease, and for the most part with strikingly good results. No untoward effect had been noticed in any case,² nor indeed any inconvenience further than a certain amount of local irritation even when the naphthol had been employed in a considerable degree of concentration, and had been applied during a period of several months and over large areas of integument.

According to Kaposi, even fifteen to twenty per cent. solutions of naphthol in oil or ointment fail to irritate the healthy integument when rubbed in or applied on cloths. On the contrary, such applications simply give an agreeable softness to the skin. When, however, the skin is inflamed, even subacutely as in chronic eczema, a single application of a weak, one per cent. ointment will excite acute inflammation. Kaposi's experience also shows that weak alcoholic solutions (one half to one per cent.) react energetically even on healthy integument. After one or two applications the skin becomes brown and desquamates slightly. On pushing the application a little further an erythematous inflammation is excited.

Naphthol is absorbed to a considerable extent by the skin and is excreted by the kidneys, giving the urine a cloudy wine-brown colour. A sort of toleration appears to be established after a time.

The only form of naphthol employed by Kaposi has been that known as β naphthol; he has found the other naphthols irritating in their effects upon the skin.

My attention having been drawn to naphthol by Kaposi's first article, I imported a quantity by the kindness of Mr. H. B. Rosengarten, of Philadelphia, but was prevented from making use of the remedy until the beginning of last spring, when I employed it at first in the clinic at the University Hospital, and later in my service at the Polyclinic, and in a few instances in private practice.

Although the comparatively small number of cases in which I have been able to make use of the remedy would preclude any independent conclusions as to its value, yet I am led to believe that, stated in connection with the conclusions of Kaposi, my results tend to show that we have in naphthol a remedy of considerable virtue in certain skin diseases, and one worthy of a wider trial and employment. I shall now give Kaposi's experience in the various affections in which he has used naphthol, adding the results of my personal experience by way of commentary.

Of the thousand cases treated by Kaposi, 536, or more than one-half,

¹ Wiener Med. Woehenschrift, No. 31, 1882.

² Other observers have noted cases where hæmoglobinuria has ensued on the too prolonged use of naphthol or its employment over an extensive surface.

were *scabies*. The formula employed by him in the treatment of these cases is as follows: R.—*Axungiae*, $\bar{3}$ vij; *saponis viridis*, $\bar{3}$ iss; *naphtolis*, $\bar{3}$ iv; *pulvis eretæ albæ*, $\bar{9}$ ij.—M. In hospital practice a single energetic application of this ointment is made over the affected parts, after which the patient is thoroughly powdered with starch, and wrapped in a linen sheet. In private practice, under-garments of linen are placed upon the patient after powdering the anointed skin, and he can then go about his ordinary avocations. A single day in hospital is enough for scabies patients, no eczematous eruption being excited by the naphtol ointment, and the irritation already existent being greatly allayed. This point, in connection with the total absence of odour in naphtol ointment, gives it very greatly the preference, in Kaposi's opinion, over the ordinary ointments employed in the treatment of scabies. The more eczema there is in connection with the scabies, the more striking is the superiority of the naphtol treatment.

I have had but little experience in the treatment of scabies, since the proverbial cleanliness of the lower class of Philadelphians makes them the very antithesis of the filthily Austrians forming Prof. Kaposi's clientèle. As far as I have had any experience, however, it has been eminently favourable to the naphtol treatment, and I have no hesitation in saying that I believe it to be the very best treatment for this affection which has yet been brought forward. A single case will suffice to show the manner in which the naphtol was employed.

CASE I.—On June 9th last, a young man applied at my service in the Philadelphia Polyclinic for the treatment of a typical though not severe attack of scabies of six months' duration. Extreme cleanliness with some ineffective treatment had prevented the extension of the disease, but well-marked lesions existed in considerable number, chiefly about the hands, axillæ, penis, abdomen, and buttocks. The patient was ordered: R.—*Naphtol*, $\bar{9}$ iv; *vaselini*, $\bar{3}$ j.—M. To be well rubbed in every evening. The patient returned in a week almost entirely cured, and a few more applications sufficed to remove all traces of an eruption which half a year's treatment had failed to heal.

Hardy, of Paris,¹ whose opportunity for observing scabies is as great as that of Kaposi himself, is enthusiastic in the praise of naphtol in the treatment of this disease. He employs a 10 per cent. ointment, made by dissolving the powdered naphtol in half its weight of ether, mixing with a portion of the vaseline, heating to between 86° and 104° F., and adding the rest of the vaseline with careful trituration. The homogeneous ointment thus made is kept from the contact of air. According to Hardy, this ointment may be used in all stages of scabies, and of the accompanying eruptions. Though slower in its action than sulphur, the itching that sometimes follows the sulphur treatment is absent after the employment of naphtol.

¹ Guérin, Thèse de Paris.

Kaposi has treated seventy-one cases of *eczema* by means of naphthol. In the squamous stage of the disease, when the affected skin is slightly hyperæmic, or is already becoming paler, naphthol may be used instead of tar to complete the cure, a $\frac{1}{2}$ to 1 per cent. ointment being applied once or twice a day, in a thin layer. After each application the patch is to be covered again with powdered starch.

In the squamous stage of *eczema* a cure is effected more rapidly if applications of alcoholic solutions of naphthol, $\frac{1}{4}$ to 1 per cent. strength, are made daily. This solution is more apt to irritate than the ointment, and should be carefully watched. When the epidermis takes on a light-brown colour the cure is complete and the naphthol should be withdrawn. In chronic squamous *eczema* ointments of 2 to 3 per cent. strength may be rubbed in. Naphthol soap may also be used, either rubbed in, or in torpid cases allowed to remain in contact with the skin.

In impetiginous *eczema* of the scalp, Kaposi uses, with good results, oils of naphthol containing one part of naphthol to one hundred parts of oil of olives, cod-liver oil, or oil of sweet almonds. Intercurrent cleansing by means of spiritus saponis kalinus, alcohol, naphthol soap, or naphthol sulphur soap, may be used to prevent the accumulation of crusts, etc.

In other affections of the scalp, as pediculosis, tinea tonsurans or favus, or where *eczema impetiginosum* is an accompaniment, Kaposi also employs this treatment, regarding naphthol as an excellent parasiticide.

My experience with naphthol in the treatment of *eczema* has led me to conclusions entirely opposite to those arrived at by Kaposi, as I have failed in every case where I have used this remedy to obtain any satisfactory result. A number of cases put upon the use of naphthol ointments and washes failed to report the results of treatment, which led to the conclusion that it must have been anything but satisfactory. This occurred with *all* the cases of vesicular *eczema*.

CASE II.—A child, two years of age, brought to the Polyelinic with an eruption of vesicular and papular *eczema* about the genital and sacral region; was ordered at first a saturated solution of boric acid as a wash. But little change taking place in the appearance of the eruption after two weeks' treatment, this was changed to the following: R.—Naphthol, $\overline{5j}$; ung. aq. rosæ, $\overline{3iv}$.—M. This proved decidedly irritating, and after using it for several weeks the naphthol was stopped, and an ointment of one drachm bismuth subnitrate to the ounce of cold cream was ordered. In *five days* the patient was discharged cured.

CASE III.—A patient suffering with well-marked papular *eczema* of the body and limbs of a month's duration was placed upon the use of the following wash: R.—Naphthol, $\overline{5ss}$; alcohol, $\overline{f\overline{5j}}$; aquæ, ad \overline{Oj} .—M. (1.5 per cent. solution). In a few days the patient returned to the clinic complaining that the wash burned the skin without allaying the itching. An ointment of naphthol of the strength of half a drachm to the ounce was then prescribed. This agreed much better with the skin, and allayed the itching, which was a prominent feature. The patient soon after disappeared from view, so that the final result of treatment was not ascertained,

but enough good effect had been produced to confirm Kaposi's statement, that the ointment of naphtol often agrees with the skin, when a wash of even less strength irritates. Here the wash was of about one-half per cent. strength, while the ointment was of nearly six per cent., but the former irritated the skin, while the latter did not.

CASE IV.—In another case of papular eczema, affecting the leg, naphtol was employed in an oily solution: \mathcal{R} .—Naphtol, $\mathfrak{D}\text{ij}$; ol. amygdalæ, $\mathfrak{f}\mathfrak{z}\text{iv}$.— \mathcal{M} . This solution (about 2 per cent.) failed entirely to relieve the itching, or to ameliorate the disease.

CASE V.—In the case of a papular eczema, involving the arm and anterior axillary border, an ointment of naphtol, one drachm to the ounce (12 per cent.), gave rise to great burning with roughness of the skin. Lotio nigra, with zinc oxide ointment, subsequently relieved the patient in a few days.

CASE VI.—An ointment of ten grains naphtol to the ounce (2 per cent.), employed in a case of typical eczema rubrum of the leg, had little or no influence upon the disease, although it did not seem to irritate the skin. A stronger ointment, two drachms to the ounce (25 per cent.), made use of in another case, gave rise to severe irritation and abrasure of the skin, without relieving any of the symptoms.

Employed in squamous eczema naphtol seemed to act more favourably, although further experiment would be desirable to ascertain the proper strength of the ointment.

CASE VII.—A boy, of fifteen, applied at the Polyclinic on July 5, showing a well-marked squamous eczema of the scalp. A solution of half a drachm of naphtol in an ounce of olive oil (nearly 7 per cent.) removed the scales very nicely. At the end of a week these were all gone, but the scalp seemed irritated and about to pustulate. The naphtol was then stopped, and a mild bismuth subnitrate ointment substituted. In three days the scalp was about well. I am inclined to think that in this case a weaker solution of naphtol would have proved more effectual.

CASE VIII.—A slight case of palmar eczema in a child; was directed the use of naphtol ointment, one drachm to the ounce (12 per cent.) After using this ointment some time no effect could be perceived, but the disease was finally, though slowly, removed.

From this series of cases, selected from a considerable number of cases of eczema treated by naphtol, it is plain that its use was in most instances unattended by any perceptible benefit.

Kaposi shows himself particularly enthusiastic over the success of his treatment of *prurigo*, which, in his hands, has now become a curable disease. He has treated thirty-three cases with naphtol. Prurigo being practically an unknown disease in this country, I have had no experience in its treatment.

In *ichthyosis*, of which five cases came under Kaposi's care, he was able to suppress the employment of baths, employing inunctions with a five per cent. naphtol ointment once or twice a day. Under the influence of this treatment the skin is said to become rapidly smooth and supple, and the eczematous complications to disappear gradually. In severe cases

Kaposi begins with the following: *R. Saponis viridis* sen *ol. morrhuae*, pts. c; *naphtholis*, pts. ii, rubbed into the skin, with intercurrent baths, in which naphthol soap is used, until slight exfoliation of the epidermis is produced. After this an ointment of five per cent. strength is to be employed.

Prurigo and ichthyosis naturally require persistent care even after the skin appears to have assumed its normal appearance. One or two baths a week, in which naphthol or naphthol-sulphur soap is used, followed by applications of five per cent. ointment, should be employed. In order to afford protection against absorption, when the treatment has to be carried on for several months, Kaposi recommends that every three weeks an emollient ointment be substituted for a while, or the following ointment may be employed: *R.*—*Glyeerin. amyli*, pts. e; *acidi borici*, pts. v. If moist or crusted eczema exists, together with the ichthyosis, in any given case, this condition must first be removed before the ichthyosis or prurigo can itself be treated.

I have not yet had an opportunity of using naphthol in ichthyosis, but I think it promises well if we can reason from the analogy of its action on the epidermis in connection with Kaposi's limited experience.

In *psoriasis* Kaposi uses a fifteen per cent. ointment, the action of which is, he thinks, less disagreeable than that of chrysarobin or pyrogallie acid. He especially prefers naphthol in *psoriasis* of the scalp and face, because it does not discolour the skin or hair, and does not give rise to irritation like the former remedies.

My experience strongly corroborates Kaposi's statements as to the advantages to be derived from the use of naphthol in *psoriasis*, as the following notes will show:—

CASE IX.—A man, of thirty-four, presented himself at the Polyclinic on June 22, with *psoriasis* of some years' duration, for which various treatment had been employed with little avail. His scalp was filled with thick yellow masses of scales, and in places, particularly the forehead and vertex, was nearly devoid of hair. There were also numerous well-marked and typical patches scattered over the body. The patient was ordered inunctions with an ointment containing one drachm of naphthol to the ounce of lard, to be applied to the patches upon the body, while a naphthol soap, composed of *R. Naphtholis*, ʒij; *saponis viridis*, ʒj. M., was ordered to be used upon the scalp; some of the lather remaining after washing to be left in contact with the surface. No internal treatment was employed.

The result was more striking than I had any reason to expect. Within four weeks the scalp was almost entirely well, and the various patches on the body had in some cases disappeared, leaving a brown stain, while in others, where the rubbing had not been so thoroughly performed, there was still a certain amount of infiltration. The patient, who was much pleased with the result of the treatment, said he had not been so well since the disease first made its appearance. I should add that the season could not have had any effect, as the eruption had in previous years been as bad in summer as in winter.

CASE X.—A second case presented itself in a middle-aged German woman, who had suffered from the disease for fifteen years, and in whom the psoriasis presented itself in large well-marked patches pretty well distributed over body and limbs. She was placed upon four minims of Fowler's solution, which, however, failed to prevent the outbreak of new lesions, and seemed to have but little effect on the older ones. Certain of these, however, having been rubbed with an ointment of naphtol, of the strength of one drachm to the ounce, began to fade and diminish with great rapidity. After about three weeks' treatment, this ointment was changed to one made according to Hardy's formula by dissolving the naphtol in ether and then rubbing up with vaseline. This ointment, used in the strength of one part to ten, or a little weaker than the former, did not seem to agree so well, and was soon dropped. When last seen this patient's eruption was nearly well in all places which had been touched by the naphtol ointment, while some patches which had been neglected were only slightly improved.

Although the naphtol ointment, as used in some other cases of psoriasis coming under my care, failed to give the results expected, yet there were circumstances connected with the eruption, which was in a more acute and inflammatory condition than in the cases given, which would account for this want of success.

I think that naphtol will prove a valuable addition to the remedies at present used in psoriasis. Its efficiency is, I think, nearly or quite that of pyrogallie acid, with less danger of toxical effect when used on large surfaces, and without the tendency to stain. Compared with chrysarobin its action is much less efficient and rapid, but the well-known objectionable features of treatment by the latter agent lead to the contented use of a less powerful but less disagreeable application.

In using Kaposi's naphtol treatment of *seborrhœa* of the scalp, the masses of sebum are first to be softened with oil of naphtol 1 per cent., and then the scalp is to be washed either with spiritus saponis kalinus or with naphtol soap. Afterwards the alcoholic solution of naphtol (25 to 50 per cent.) is to be kept applied for five to seven days. At the end of this time a transparent brown pellicle of smooth, uniform, very adherent epithelium, is found on the pale skin. The usual stimulant applications may then be made to the scalp, or, if hyperæmia persists, the alcoholic solution of naphtol may be once more applied. The same treatment may be employed advantageously, according to Kaposi, in premature alopecia due to *seborrhœa* in anæmic women or men, as well as in scaly *seborrhœa* of the nose and other parts of the face.

But few cases either of true *seborrhœa sieca capitis* or of that form of pityriasis of the scalp which is usually confounded with it, have come under my notice since I have read Kaposi's latest paper on naphtol.

CASE XI.—In one of these cases a young girl presented well-marked *seborrhœa* of the scalp; great benefit was derived from the use of the following: R.—Naphtol, ℥j; sulphuris, ℥ss; saponis viridis, ℥iv.—M.

This was used as a soap with hot water to cleanse the scalp once daily, a small portion of lather being allowed to dry on the scalp. At a later date a solution of naphtol in alcohol, twenty grains to the ounce ($\frac{1}{4}$ per cent.), was employed in the same case, also acting favourably.

CASE XII.—A second case, also in a female, of fairly well-marked *seborrhoea sicca* was placed upon an ointment of naphtol in vaseline, one drachm to the ounce, under the use of which very marked improvement was noted during the time the patient was under observation.

In *acne*, *acne rosacea*, *sycosis*, and *lupus erythematosus*, Kaposi has obtained excellent results from the methodical application of naphtol in the form of naphtol soap, naphtol sulphur soap, and a paste composed of alcohol, sulphur, and naphtol. In these cases the foam of the soap is allowed to remain in contact with the skin over night, and is washed off next morning, while some other preparation which will permit the patient to go about his occupations is applied during the daytime. In *acne* and *sycosis* "Wilson's ointment" (ung. zinci ox.) may be used for this purpose, while the same ointment or emplastr. hydrarg. may be employed in *lupus erythematosus*. Better still, in some cases, the naphtol application is repeated in the morning until a thin brown epidermic pellicle is formed. This adheres the more closely the more the effect of the remedy is produced, that is, the more the tumefaction and hyperæmia have diminished. In *lupus erythematosus* this amelioration manifests itself by flattening and disappearance of the edges, which have been sharply cut and deeply infiltrated.

The following paste will often take the place of the soap application: R.—Naphtol, gr. iv; sp. sap. kal. gr. c; alcohol, gr. ec; balsam Peru, gr. viij; sulphur precipitat. gr. xl.—M.

Having had no experience as yet in the treatment of these affections by means of naphtol, I cannot, of course, express any opinion regarding the efficacy of the drug.

In *hyperidrosis* of the palms, soles, etc., Kaposi has obtained rapid, often immediate relief by the aid of naphtol applications. In many cases, however, the secretion of sweat returns after a time, just as it does after the use of other agents. Kaposi employs the following formula: R.—Naphtol, gr. xxiv; alcohol, \mathfrak{z} j; glycerine, gr. l.—M. This is to be applied twice daily, and followed by powdered starch alone or containing two per cent. of naphtol. In *hyperidrosis plantarum*, cotton impregnated with the powder may be placed between the toes.

In one case bad results followed the use of naphtol. A patient who had used a five per cent. alcoholic solution for three days had an eruption of bullar erythema annulatum of the palm and back of the hands, which, however, disappeared within eight days after the applications were stopped. In many cases of generalized hyperidrosis, even in consumptives, a one or two per cent. solution of naphtol in alcohol gives relief.

I have treated three well-marked cases of hyperidrosis according to the

method just indicated, with, I must admit, very imperfect success. Two of the three were very slightly if at all improved; and the third case, a very marked one, failed to report, and I am convinced did not benefit by the use of the naphtol.

According to Kaposi, all varieties of *tinea tricothytrina* are quickly cured by means of naphtol. The application of a one per cent. alcoholic solution, repeated four or five times in two or three days, or of the naphtol-sulphur soap rubbed in and allowed to dry on the skin, desiccates the patches of disease very rapidly. When the disease is extensive, the following application can be made: R.—Saponis viridis, ʒj; naphtol, gr. x; sp. lavandulæ, gr. l. To be followed by the application of powdered starch. One application every two or three nights is enough.

In *tinea tonsurans*, Kaposi has met with good results in the use of naphtol after epilation.

My experience in the treatment of *tinea tricothytrina* by means of naphtol leads me to a very moderate appreciation of the merits of the drug for the destruction of this and the other vegetable parasites.

CASE XIII.—In a case of *tinea circinata menti*, rapidly merging into parasitic sycosis, an ointment of naphtol and vaseline, a drachm to the ounce, was employed for several weeks entirely without effect, new patches of disease appearing under the ointment. An ointment of double strength (25 per cent.) was then substituted, but only with the effect of irritating the skin.

CASE XIV.—In a second case of an almost precisely similar character a 25 per cent. naphtol ointment was used for between one and two weeks with some slight improvement. A weak ammoniated mercury ointment being then substituted for the naphtol, speedy recovery took place.

In several mild cases of *tinea circinata* of the non-hairy portions of the body somewhat better results were obtained.

CASE XV.—A young man presented himself at my office with a half-dollar sized ring of *tinea circinata* encircling the angle of the mouth on either side. The disease was quite recent, and the very scanty hair was not at all affected. An ointment containing eighty grains of naphtol to the ounce of cold cream was prescribed. I then lost sight of the patient, but ten months later he came to consult me for some other affection of the skin, when he informed me that the naphtol ointment had proved effectual in removing the ringworm.

CASE XVI.—A lady applied at my office for the relief of a well-marked and rapidly growing patch of *tinea circinata* the size of a silver dollar situated over the left scapular region. She was ordered an ointment of one drachm of naphtol in an ounce of cold cream, and, although this was rather negligently applied, the lesion was gone at the end of about four weeks.

CASE XVII.—A young man came to the Polyclinic about the beginning of July with a narrow, wavy line of *tinea circinata* extending across the outer forehead, arching from the outer edge of one eyebrow to the outer edge of the other. The disease was of about two months' duration, and was spreading rapidly. An ointment of a drachm of naphtol to an ounce of lard thoroughly applied cured the disease in about a fortnight.

Kaposi does not mention the employment of naphtol in the treatment of *tinea versicolor*. I have used it in six cases. In two of these, where naphtol ointment the strength of one drachm to the ounce was employed, the patients failed to report the result of treatment. In another case, where the ointment was used faithfully for some time, no improvement was shown. A fourth case improved slowly during a month while the patient was under observation, but the treatment was given up as unsatisfactory.

CASE XVIII.—A well-marked case of *tinea versicolor*, chiefly occupying the chest, but also to some degree the groins, was placed upon the external use of sulphurous acid with *sapo viridis*, which removed the eruption to all appearance completely. A relapse occurring, the patient was ordered a naphtol ointment, one drachm to the ounce, which after six weeks' use failed to work any perceptible benefit. He was then ordered Vleminekx's solution, of which a four-ounce bottle sufficed to cure him.

The remaining two cases of *tinea versicolor* did better.

CASE XIX., of eighteen months' standing, used the ointment of one drachm to the ounce for twelve days, and at the end of that time reported very marked improvement. In fact the disease had been entirely removed at all points where the naphtol had been applied. The patient was directed to employ the naphtol ointment more carefully and extensively, but failed to report further progress.

CASE XX., occurring in private practice, was that of a middle-aged man, who had *tinea versicolor* of thirty years' standing. The naphtol ointment used in this case was only half as strong as that used in the other cases of *tinea versicolor*, being a half drachm to the ounce. After using it for a week the itching, which had been a remarkable feature of the disease, diminished to a marked degree, and the patient declared he had found no previous treatment of so much benefit. On examination, however, I failed to find very much improvement. After an absence of several months, during part of which time the patient had used the naphtol with benefit, but had neglected it later, he returned with his skin disease about as bad as ever. He was then ordered to use *sapo viridis* with the naphtol ointment, and disappeared.

I have had no opportunity to employ naphtol in *favus*. Kaposi says he has used a 1 per cent. oil, followed by naphtol soap, with great success.

The conclusion I draw from my experience with naphtol in the treatment of the vegetable parasitic skin diseases is, that while it is a parasiticide, and may be employed in some cases with success, it is much less efficient than the ordinary parasitocides in present use, and possesses no advantage whatever over them.

Kaposi says that *pediculosis pubis* is very satisfactorily treated by means of a mixture of equal parts of olive oil and naphtol. It kills the parasites completely, and has no disagreeable colour or odour like many of the remedies employed. I have had no experience in the treatment of this form of pediculosis by means of naphtol, but have recently employed this formula in *pediculosis capitis*.

I have thus endeavoured to give some account of my experiments with

this drug in the various affections for which it has been recommended by Kaposi, and I may give my impressions as to its general value in a summary way, as follows:—

1. *Scabies*.—In naphthol we have one of the most efficient and agreeable remedies for scabies which has as yet been brought forward. Both in the rapidity of its action and in its beneficial effects upon the inflamed skin it is superior to any of the means ordinarily employed for the cure of this disease.

2. *Eczema*.—Well spoken of by Kaposi in eczema, naphthol has failed in other hands to give the same beneficial results.¹ In most cases of vesicular and acute eczemas generally its action is simply that of an irritant. On the other hand, it has a limited field of action in the cure of a certain number of squamous eczemas of the scalp.

3. *Prurigo*.—Naphthol is highly extolled by Kaposi in prurigo, but I have had no experience with it.

4. *Ichthyosis*.—Kaposi speaks well of naphthol. I have had no experience.

5. *Psoriasis*.—Naphthol is in my opinion a valuable addition to our external means of treatment in psoriasis. Kaposi speaks well of it in psoriasis of the scalp in particular, and my experience would lead me to place it near chrysarobin and pyrogallie acid in effectiveness without the neutralizing disadvantages of either of these drugs.

6. *Seborrhœa*.—In seborrhœa of the scalp naphthol is a decided addition to our means of treatment. While inferior in some respects to sulphur or carbolic acid, it has a certain range of usefulness which further experience will in all probability more exactly demonstrate.

7. *Aene, Acne-rosacea, Sycosis, and Lupus Erythematosus*.—Kaposi believes naphthol to be of benefit in each of these diseases. I have as yet had no experience in their treatment by its means.

8. *Hyperidrosis*.—Naphthol is highly lauded by Kaposi in the treatment of hyperidrosis, but in my hands it has failed entirely, although used strictly according to his formulæ. I consider it quite valueless in this disease, as far as my experience goes.

9. *Tinea Tricophytina*.—Kaposi considers naphthol an efficient parasiticide, but my experience leads me to regard its effects in ringworm as inferior to those of almost all of the remedies at present used.

10. *Tinea Versicolor*.—I do not know of any experiments of Kaposi's in the treatment of tinea versicolor by means of naphthol. My experiments lead me to regard it as almost entirely inefficient in most cases.

11. *Favus*.—Naphthol is considered effectual in this disease by Kaposi. I have had no experience, but am inclined by analogy to doubt its superiority to remedies hitherto in vogue.

¹ Possibly the employment of weaker preparations may induce a change in my views on this subject. I have not yet had an opportunity to use these.

12. *Pediculosis*.—Kaposi finds naphthol a valuable agent in the treatment of pediculosis pubis. I have had no experience here, but in a single case of pediculosis capitis its action was favorable.

In conclusion, I wish to guard myself from the imputation of too dogmatic assertion as to the merits and demerits of the drug under consideration. It is sometimes difficult to give full clinical evidence for one's opinions, and I desire to say that my experience with naphthol extends beyond the evidence I have given, and has perhaps somewhat influenced my opinion as to the value of the drug. Its exact place in dermatic therapeutics remains to be ascertained, but I am inclined to think it will prove a not unimportant one.

ARTICLE XIV.

PERIOSTITIS OF THE MASTOID; NECROSIS; RECOVERY.

By WM. S. CHEESMAN, M.D., of Auburn, New York.

ON October 12, 1882, I was called to attend a gentleman, æt. about thirty, of not over-vigorous constitution, who had suffered from chronic suppurative otitis media of the left side since an attack of scarlatina in childhood. Some ten days before I saw him his old trouble underwent an acute exacerbation, and after causing great suffering, the "gathering broke," and much blood and a little pus poured out. Temporary relief had been thus afforded, but pain soon returned. His physician, deeming it unsafe to meddle with the ear, had left the ease to nature.

Physical examination showed the external auditory canal to be much swollen; within all was pus. Discharge had, however, ceased. No air could be forced through the Eustachian tube by Politzer's method. Hot douches every three-quarters of an hour, anodynes at night, leeches to the tragus and the mastoid, all failed to give relief or secure sleep. The pain was sometimes lancinating, sometimes throbbing, and in addition there was a severe neuralgia of the occipitalis major nerve and of some branches of the trigeminus.

14th. Slight swelling and tenderness of the mastoid began, which by the 16th had so much increased that the auricle *protruded* at an angle of 45°, being itself greatly swollen. The temperature ranged at 101° in the evening. Wilde's incision seemed to offer a good prospect of relief, but in a consultation held that afternoon it was thought best to continue poulticing, and to await the formation of pus.

20th. Fluctuation was detected behind the ear on a level with the upper wall of the external auditory canal. The hypodermie here drew pus.

Anæsthesia of the skin having been produced by the ether spray, an incision was made, and half an ounce of fetid pus evacuated. At the bottom of the wound the probe detected bare bone over a space about one inch square. The wound was douché with hot carbolized water, and a drainage tube inserted. Relief from pain was immediate, and the patient slept all night for the first time in two weeks.

Under the use of hot douches and poultices the swelling rapidly subsided, and on the 23d, the middle ear was inflated by Politzer's syringe, and the perforation of the drum located in the posterior inferior quadrant. With a loud whistling sound the compressed air forced through it a gelatinous material into the external auditory canal.

Within a couple of weeks the patient was able to go out. The ear was douché and the wound cleansed twice a day. The area of bare bone became rough, and granulations pouted about the mouth of the wound in the manner characteristic of necrosis; but no bone loosened. Dilute aromatic sulphuric acid was used as an injection with a view to dissolving the dead bone. It was deemed unwise to attempt to check the middle-ear discharge till the mastoid trouble should be passed.

All went well until the middle of December. The discharge then became scanty, the patient had chilly feelings, his bones ached, and he vomited. The meatus was swollen and nearly closed; the left cervical glands became indurated and tender; the evening temperature ranged at 101°. At the same time, I found that the probe introduced through the drainage track did not move freely over the necrosed surface, and it was thought that granulations had sprung up and shut off a portion of that surface, damming in pus. Accordingly, the patient was etherized, the wound enlarged, and the whole area of bare bone exposed. It was found that the track in which the drainage tube had been inserted had adhered to the bone immediately at its bottom, and that thus the space around had been shut off from drainage. The whole necrosed area was then scraped bare of a few flabby granulations, and, by means of a dental engine, *burred* away till the bone was seen to bleed, and a smooth and apparently healthy surface remained. I hoped that the tedious process of exfoliation might thus be prevented, and that, living bone having been reached, the wound might granulate from the bottom. This was therefore packed with cotton soaked in balsam of Peru, and poulticed. The temperature range at once became normal, and in a few days swelling subsided and appetite returned. The usual douches of the ear and wound were resumed.

For three weeks it seemed that my hopes were not ill-founded. Granulations formed rapidly over the *burred* surface, and the patient was able to ride and walk out. But on the 3d of January I found the external auditory canal again swollen, the patient complaining of nausea, and the temperature at 100°. Exploration among the granulations detected a pus cavity leading toward the auricle. Though this was thoroughly cleansed

and packed, the symptoms were not relieved. On the 6th the swelling in the auditory canal pointed and was cut, some pus being evacuated. The same day a probe introduced among the granulations at the bottom of the wound entered, greatly to my surprise, the mastoid antrum. How this opening into the cells had occurred, I could not divine. No loose fragments of bone had ever been felt by the probe, and none had been discovered in the discharges; and yet a portion of the outer wall of the antrum had come away. The process could not be termed exfoliation; no flake of bone was ever known to have separated. It seemed rather a disintegration, ulceration; molecular death and removal going on imperceptibly, till the outer wall of the mastoid chamber was perforated. No pus was found within, nor did the antrum or the cells ever become implicated.

During the night of January 7th, the patient had a rigor, and another pocket of pus was found in the anterior wall of the wound. The next day, January 8th, Dr. John Van Duyn, of Syracuse, saw the patient with me. He was etherized, the old incision continued downward to the tip of the mastoid process, a track formed from the lower end of this cut, passing between the auricle and the skull, to the periosteal abscess in the external auditory canal, and strands of silk soaked in carbolyzed wax inserted as a tent. The cut itself was packed with cotton soaked in carbolyzed oil, and poulticed. The temperature now rapidly fell to normal, and swelling and tenderness disappeared. The drainage track above described was syringed twice a day, the water escaping from the external meatus. Iodoform was freely used in the dressings.

From this time progress to recovery was well-nigh uninterrupted, granulations growing from the bone, and filling the wound compactly from the bottom. They were repeatedly trimmed down, in order to insure against possible pocketing of pus. Once such a cavity was discovered among them, but when it had been opened and cleansed the symptoms due to it disappeared. It became necessary in about a month to remove a granulation mass that sprouted from the drainage sinus at its entrance into the auditory canal, nearly occluding that passage. This was easily done by means of Bosworth's modification of Wilde's snare. The patient was discharged cured April 28, 1883, nearly seven months after the beginning of his sickness.

REVIEWS.

ART. XV.—*Spinal Concussion.*

Injuries of the Spine and Spinal Cord without Apparent Mechanical Lesion and Nervous Shock, in their Surgical and Medico-Legal Aspects. By HERBERT W. PAGE, M.A., M.C. Cantab., Fellow of the Royal College of Surgeons of England, etc. Philadelphia: P. Blakiston, Son & Co., 1883.

IN 1866 a volume, entitled *Six Lectures on Certain Obscure Injuries of the Nervous System commonly met with as the result of Shocks to the Body received in Collisions on Railways*, was published by the great English surgeon, Eriehsen. In 1875 these lectures were expanded into a larger work on *Concussion of the Spine*, which, at the time, attracted widespread attention, and has since been regarded in many quarters as high authority, both surgical and medico-legal. The acknowledged eminence of its author, and the evidence of investigation of surgical literature and of personal experience shown by the book itself, gained for it a foothold which it still largely maintains. The second edition is before us as we write, and we remember reading the first with much pleasure, and turning to it with avidity when, by good or bad chance, an admiralty case fell into our hands as expert. It should certainly receive the hearty endorsement of some socialistic convention, for it has proved one of the greatest practical enemies of corporations, taking money without stint from their coffers—money for litigants, for lawyers, and for experts.

Since the publication of Mr. Eriehsen's volume "spinal concussion" has not infrequently been treated at greater or less length in journals and general works on surgery or neurology, most writers, but not all, following blindly in the wake of Mr. Eriehsen. The volume of Mr. Page, which forms the basis of the present review, is, however, as far as we know, the first systematic attempt to discuss thoroughly the subject in surgical and medico-legal aspects.

This work will prove of great service. It is a highly practical contribution to medicine and surgery. The author has acted for a number of years in the capacity of surgeon to the London and Northwestern Railway Company, and therefore has had abundant opportunities to become practically acquainted with the subjects which he discusses. A large part, but by no means all of the book, constituted the Boylston Medical Prize Essay of 1881. Notwithstanding the author's connection with a great corporation, the charming spirit of justice to all, which pervades the volume, makes us feel that he has written, as he claims, without any spirit of partiality or bias, and that, although his experience has been, for the most part, gained while acting as surgeon to a railway company, there has been nothing whatever in the circumstances of his appointment to impair, even in the very smallest degree, that free and perfect independence which is the rightful possession of a medical man. His work is worthy of

all commendation, and will, no doubt, rank in the future with those standard volumes which lawyers and medical experts delight to consult and ponder on in preparation for the exigencies of a trial for damages for railway or similar injuries. We have deemed it worthy of a somewhat extended analysis.

The importance of the topics discussed will be better appreciated when the frequency with which injuries of the spine, or supposed injuries of the spine, become the subjects of arbitration, or judicial investigation is fully recognized. Mr. Page points out that injuries of the back more often become the subject of medico-legal inquiry than any other kinds of injury to which man is liable. Of 250 cases, which constituted the whole number in one of his note-books, no fewer than 145 complained of their backs or their "spines." He refers to a similar observation by Rigler, a German writer, who gives statistics which show that since the passing of a law in Germany for the compensation of injured persons on railways the number of injuries or complaints of injuries had enormously increased, and that, moreover, of thirty-six complaints of injury no fewer than twenty-eight were of the back.

Railway and other corporations are, by no means, the only financial sufferers from the popular doctrine of "spine disease" and "spinal concussion." Among those who manage to live a large portion of their time on the charity of benevolent and beneficial societies the "spine" cases form a large contingent, as our own experience during a few years has abundantly shown; and in claims for pension by old soldiers—many of them "old soldiers" in the proverbial sense—the "spine" is found to be a convenient portion of the body to localize not a few of those ills which have had their origin as much in the overflowing generosity of Congress as in the accidents and incidents of war.

In Chapter I., at the very outset of his inquiry, Mr. Page seeks to learn how far the spinal cord is really liable to injury. He at once, of course, acknowledges the grosser lesions of the spinal column and cord, from terrible accidents, which have been as well enumerated by Sir Benjamin Brodie as by almost any author since his time; for example, fractures without displacement, fractures with depression or displacement, and causing pressure on the spinal cord, fractures complicated with dislocation, dislocations not complicated with fracture, extravasations of blood on the surface of the membranes of the spinal cord, narrow clots of blood within the substance of the spinal cord, and laceration of the spinal cord and its membranes.

He quotes and discusses the views and reported cases of Brodie, Abercrombie, Sir Charles Bell, Mayo, Boyer, and Lidell, clearly sustaining the position that in the serious cases of spinal injury attributed to "concussion of the spine," some gross lesion, as hemorrhage, fracture, dislocation, twisting of the cord, or wounding of great nerve-trunks, has most probably occurred. Evidences of such lesions cannot always be had during life, and post-mortem examinations are often imperfectly performed. Even recoveries, or partial recoveries, are as explicable from this standpoint as from that of the mythical concussion. Extravasated blood is sometimes absorbed, and recoveries may take place even after dislocation of the vertebræ. In a final note, Mr. Page gives from the *Lancet* the record of two remarkable cases, which appeared after the chapters of his book were made ready for the press. The first is a case of "dislocation of the fifth cervical vertebra, with reduction and recovery," under the

care of Mr. T. H. Cecly, in the Royal Bucks Infirmary. The second is reported as "a case of recovery after a broken neck," by Mr. C. Jordison, of Malpas.

The analogy between "concussion of the brain" and so-called "concussion of the spinal cord" is examined. We accord entirely with the opinion of Mr. Prescott Hewett, quoted by Mr. Page, that it still remains to be demonstrated that concussion may prove fatal without leaving a trace of injury to the brain-substance. Even in cases of recovery lesions may have occurred, and have been gradually repaired.

It has seemed to us that Mr. Page has devoted too little attention to the views of M. Duret. He confines himself to a single remark, that M. Duret regards the phenomena of concussion as due to change in the tension of the cerebro-spinal fluid rather than to any effects upon the cerebral mass itself. M. Duret's physiological experiments and opinions were ably summarized and reviewed in the *American Journal of the Medical Sciences* for January, 1879, and need only be very briefly alluded to at present. Seeking for the cause and mode of production of concussion of the brain, he found that severe blows upon the head, sufficient to depress but not to fracture the skull, so acted upon the hemispheres and the cerebro-spinal fluid as to cause that portion of the latter contained within the lateral ventricles to pass suddenly through the aqueduct of Sylvius into the fourth ventricle, causing the latter and sometimes the central spinal canal to be dilated or even ruptured, and thus bringing about the phenomena of cerebro-spinal shock.

M. Duret showed that lesions, chiefly in the form of hemorrhagic foci, were produced in cases of concussion by peripheral and ventricular waves of the cerebro-spinal fluid. There hemorrhages were found on the convexity of the hemispheres, at the base of the brain, in the floor of the fourth ventricle, in the substance of the medulla and pons, and even at different points of the spinal cord. One case of traumatic locomotor ataxia is reported, caused by a blow on the side of the head, the lesion consisting of an extravasation under the pia mater covering the posterior columns. Accepting these views we have an explanation of otherwise obscure cases; not from spinal, but from cerebral or cerebro-spinal concussions, the lesions, however, being really gross.

The very first paragraph of Mr. Erichsen's book contains, we think, the expression of an erroneous opinion. Comparing injuries to the head and to the spine, he asserts that if the brain is liable to suffer serious primary lesion and protracted secondary disease from the infliction of slight and perhaps, at the time, apparently trivial injuries to the head, the spinal cord is at least equally prone to become functionally disturbed and organically diseased from injuries sustained by the vertebral column. On the contrary, clinical and pathological experience both sustain Mr. Page in the view which he confidently expresses, that, with very rarest exception, the spinal cord maintains its supremacy as the most securely protected of all the organs of the body.

The spinal cord is infinitely better protected from the effects of blows and jars than the brain; its special attachments, its paddings and buffers, the very thick walls of its bony canals—serve to guard and defend it almost impregably.

Mr. Page is unable to find cases of concussion, injury of the spinal cord, without real gross damage to cord or column, comparable to cases of concussion of the brain. Even if the analogy in any case holds good,

"it is only in the very rarest instances that it can be unequivocally maintained." He thinks it highly improbable that the spinal cord should be especially liable to suffer injury in railway collisions, no matter how trivial they may be, and even though no damage has been inflicted on or near the spinal column.

Chapter II. of Mr. Page's book is devoted almost entirely to an analysis and criticism of Mr. Erichsen's views on so-called "concussion of the spine." He begins, and very properly, by finding fault with the title "concussion of the spine." The term "spine" is by some applied to the vertebral column; by others to the contents of the spinal canal; by still others to both the case and its contents.

"And to employ for the common injuries received in railway accidents a title which may now mean this, and now that, and very often may mean nothing at all, is to run a risk, it seems to us, of either playing into the hands of those who are using dishonest means to enhance their claims, or of seriously misleading those who, from lack of experience and opportunity, are ignorant of the symptoms and pathology of diseases of the spinal cord."

We will now put in contrast the views of Mr. Erichsen and Mr. Page by a few selected quotations. Mr. Erichsen speaks of "concussion of the spine" as follows:—

"It is a phrase generally adopted by surgeons to indicate a certain state of the spinal cord occasioned by external violence—a state that is independent of, and usually, but not necessarily, uncomplicated by, any obvious lesion of the vertebral column, such as its fracture or dislocation, a condition that is supposed to depend upon a shake or a jar received by the cord, in consequence of which its intimate organic structure may be more or less deranged, and by which its functions are certainly greatly disturbed, so that various symptoms, indicating a loss or modification of innervation, are immediately or remotely induced."

The following quotations may serve to give an idea of the views of Mr. Page:—

"When we meet with paraplegia occurring after severe injuries to the spine, and there be no direct evidence of damage thereto, there is yet strong presumptive evidence, from the lessons of the dead-house, that the vertebral column has itself been severely injured, and that from the immediate consequences of such injuries the function of the spinal cord has been annulled and destroyed.

"Used now to indicate this injury, and now that, here signifying the cause, there the effect, by a writer so distinguished as Mr. Erichsen, it is little wonder that a wider application even has been given to the term, and that, as we shall see by and by, 'concussion of the spine' is used almost indiscriminately both in and outside the medical profession to indicate the injuries which are received in collisions and which become the subject of medico-legal inquiry, although the spinal column and its contents have met with no damage at all. It appears to us nothing less than lamentable that, in laying before the profession and the world the results of his experience upon this subject, and writing from the high vantage ground of an assured position, both as a surgeon and as a teacher of surgery, Mr. Erichsen should not have been more clear, more explicit, and less ambiguous in the use of the phrases which he has employed."

"As has been abundantly pointed out in the preceding pages, there is but scanty proof of the liability of the spinal cord to suffer from concussion, pure and simple, in the absence of simultaneous injury to the spinal column, the exceptional cases being extremely rare.

"And if uncomplicated 'concussion' lesions be so exceptional, and the spinal cord be, as we believe the common experience of surgeons proves it to be, the most securely protected of all the organs of the body, it seems most improbable that it should be prone to incur lesions due solely to indirect and general concussion."

The weakness of the cases used by Mr. Erichsen to illustrate and substantiate this doctrine of "concussion of the spine" is really astonishing, as Mr. Page amply demonstrates.

In attempting a pathological explanation of "concussion of the spine," Mr. Erichsen, as Mr. Page shows, is as unhappy as in some of his other efforts.

"The primary effects of these concussions or commotions of the spinal cord," he says, "are probably due to molecular changes in its structure. The secondary are mostly of an inflammatory character, or are dependent on retrogressive organic changes, such as softening, etc., consequent on interference with its nutrition."

The phrases "molecular changes," "molecular disturbances," are simply made to do duty for ignorance. The nervous system is so constituted that even a jar, shake, or concussion, is more likely to produce vascular than "molecular" lesions, if by the latter is meant change in nerve-cell or fibre.

Mr. Erichsen concludes that the whole train of secondary nervous phenomena arising from shakes and jars of, or blows on, the body, characteristic of concussion of the spine, are in reality due to inflammation of the spinal membranes and cord. What proof of this pathology has ever been presented? It is a remarkable fact, that Mr. Erichsen himself is acquainted with only one case with a post-mortem record; and inquiry as to the merits of this particular case is not very encouraging to his peculiar views. From a careful reading of this case, it would seem likely that it is an instance of posterior spinal sclerosis, the collision and the coming in of the disease being probably simply a coincidence.

In more than one place, and by convincing argument and illustration, Mr. Page shows the utter fallacy of the wide-spread, yet erroneous, impression both throughout the profession and the laity that the effects of a railway collision upon the spinal column or cord are most likely to be remote.

"Our inquiries," he says, "have either been singularly unsuccessful, and they have been made by direct oral and written communications with many professional brethren in all parts of the country—or we must admit that secondary and remote degeneration of the spinal cord, in cases where there has been no distinctive evidence of injury, is very rare indeed. We say *distinctive evidence*, for we hold that we cannot include amongst injuries to the spinal cord those molecular disturbances which must affect every tissue or organ in the body when subjected to any severe general shake or jar. Molecular disturbance is not necessarily molecular disintegration or pathological change, and there is no evidence to show that molecular disturbance is in itself a grave condition, or likely to have evil results, unless there should have been at the time some well-marked pathological lesion such as might *post mortem* be discovered by the eye. Were 'molecular disturbance' to be followed by pathological change as a direct result thereof, the consequences of unnumbered slight injuries would be serious indeed."

Injuries to the muscular and ligamentous structures of the back and of the spinal column are frequent causes of the real symptoms which are present after railway collisions. Mr. Page holds from experience, and from the arguments which he has heard about individual cases, that real but comparatively favourable injuries of this kind combined with the symptoms of general nervous prostration or shock have laid the foundation for the erroneous views so largely entertained as to the nature of the common injuries of the back received in railway collisions. Pain on move-

ment, tenderness on pressure, pseudo-paralysis the result of a fear of moving, want of freedom in micturition, and a constipation which simulates paralysis of the bowels from lack of the support and help which the lumbar muscles usually provide, conjoined with great mental disturbance from shock, lead the patients to feel that they have been stricken with some terrible spinal catastrophe from which they may never recover.

Dr. R. M. Hodges, quoted by Mr. Page in a foot-note, has called attention to these sprains of vertebral ligaments and ruptures of the aponeuroses and muscles of the back, as causes of the phenomena assumed to be those following concussion of the spinal cord.

"They give rise to much local pain, to a rigidity of the spine, a difficulty in rising from the seat, a stiffness in walking, and contribute readily to any disposition on the patient's part to make much of his injury. The attitude, or the cautious and constrained movements of the body, may be made to suggest inferences which cannot be too guardedly accepted."¹

The spinal nerves are sometimes injured by strain or direct contusion in railway and similar accidents. Hilton, quoted by Mr. Page, in his work on *Rest and Pain*, speaking of a man falling with his back upon the ground, says:—

"It is possible that the spinal marrow, obeying the law of gravitation, may, as the body falls, precipitate itself in the same direction, fall back towards the arches of the vertebrae, and be itself concussed in that way. Or the little filaments of the sensitive and motor nerves, which are delicately attached to the spinal marrow, may for a moment be put in a state of extreme tension, because, as they pass through the intervertebral foramina, they are fixed there by the dura mater, and if the spinal marrow be dragged from them, the intermediate parts must be necessarily put on the stretch, producing at the time the pins and needle sensation, and also explaining the symptoms felt on the following day."

Mr. Page refers to a point of great practical moment to those whose duty it may become to examine cases claiming damages for spinal injury, namely:—

"The importance of learning and paying due regard to the precise history of the accident and of the injury, so that we may escape from the region of cloud-land where we hear no more than that a man has been in a collision, and had concussion of the spine and become paralyzed."

The real value of pain in the back as an indication of serious disease is fully discussed. This symptom is almost invariably present in the railway cases; and in the vast majority of cases, when it is not due to muscular or ligamentous strain, it is hysterical or imaginary, and nothing else.

It is a remarkable fact that Mr. Page, with his large experience, has met with no case where spinal caries and ultimate curvature have been produced by injury to the back in a collision.

Our own experience is in accordance with that of Mr. Page, with reference to the traumatic origin of *tabes dorsalis*. We have met with but few cases where any direct relation could be traced between an injury and the origin of ataxic symptoms, although, in the light of M. Duret's experiments, we admit the possibility of such an occurrence.

Two chapters (IV. and V.) are devoted to the consideration of "shock to the nervous system," as seen after railway collisions. Very wisely he

¹ Boston Medical and Surgical Journal, April 21, 1881.

begins his discussion of this subject by explaining the sense in which he uses the expression shock to the nervous system, namely, as a term applicable rather to the whole clinical circumstances of the case than to any one symptom which may be presented by the injured person. The very lack of precision in the phrase appears suitable to describe the class of cases considered, the course, history, and general symptoms of which indicate some functional disturbance of the whole nervous balance or tone, rather than structural damage to any organ of the body.

Three classes of cases of nervous shock, not including those in which a fatal issue rapidly ensues, are discussed and illustrated: (1) Cases of undoubted collapse from the bodily injury received and from the very distressing surroundings of the accident; collapse or severe shock both from bodily and mental causes. (2) Cases in which the accident has been less severe in its effects upon life and limb, and where the earliest effects of shock have been comparatively slight; here mental predominate over physical causes, although both may be present, and the cases are genuine. (3) Cases which have no history whatever of injury or of the symptoms of collapse, no faintness, nausea, or vomiting, no early reaction from an initial stage of depression, but where the after-history very closely simulates that of the second class of cases; these are examples of spurious nervous shock.

Mr. Page discusses briefly the cases of profound shock or collapse from severe and sudden injuries, whether inflicted upon the head or upon some other part of the body, the condition about which the surgeon usually asks first in cases of grave accident. He does not enter at length into the pathology of shock, stopping only to speak in terms of highest compliment of the very able account of shock in all its bearings, in the *International Encyclopædia of Surgery*, by Mr. C. W. Monsell-Moulin, who sums up the results of experimental physiology by saying that "shock is an example of reflex paralysis in the strictest and narrowest sense of the term—a reflex inhibition, probably in the majority of cases general, affecting all the functions of the nervous system, and not limited to the heart and vessels only."

Great stress is laid upon the element of fear in railway collisions in inducing immediate and serious collapse, and in giving rise to the troublesome after-symptoms in the cases which recover from the first shock. He tells the following interesting story:—

"How largely fright may of itself be a condition recognized as shock is well shown by a case communicated to us by a surgeon of large experience, who, summoned to a railway station to see and conduct to the hospital a railway servant who had had his foot, as was supposed, run over on the line, found him in a state of collapse, and in greatest alarm as to the injury to his limb. Upon examination it was discovered that the only damage was the dexterous removal of the heel of his boot by the wheel of a passing engine."

The various symptoms which are commonly met with in genuine cases of protracted nervous shock, whether that shock has been due to bodily injury, excluding concussion of the brain, or where the bodily injury has been but trifling, and the mental shock severe, are set forth at length by Mr. Page. In the light of these symptoms, instead of "railway-spines," many of the cases under discussion had better be termed "railway-brains." Headache, sleeplessness, altered pulse and heart-beat, nervousness, asthenopia, and loss of memory are by no means spinal; and even paralysis, anaesthesia, and spasm, whether functional or organic, are as likely, or, on the whole, more likely to be cerebral than spinal.

The happily conceived term "litigation symptoms" is applied to many of the manifestations which follow accidents by railway. Differences of opinion arise between those who have to receive and those who have to provide compensation; litigation ensues and the plaintiff is subjected to the delays, anxieties, and worries of a lawsuit. Patients rarely return to work so long as the question of compensation and the possible disputes attending it remain unsettled. Want of occupation, and sometimes of exercise, leads to wretchedness both of body and mind. Comparing a railway patient waiting for compensation with another, a hospital patient, whose state is as nearly similar as may be, and who is compelled to resume work as soon as possible, the latter gets well, the former lingers month after month.

Mr. Page cites several cases in his Appendix to show that, in serious injury to limb, such as fracture, even if there be extreme collapse at the time of the accident, it is most unusual to meet with the protracted after-symptoms which have been described as due to general nervous shock. The reasons for this are that the injury is precise, definite, and not obscure, complete rest is enforced, and there is but little likelihood of dispute arising as to compensation. "Litigation symptoms" are absent, because litigation is not needed.

To bromide of potassium is attributed the prolongation of the illness and delay in convalescence in some cases. Very properly is the wholesale use of this drug in almost any and every kind of nervous disorder denounced. "It is not by a lavish use of bromides," says our author, "that success in the treatment of neurasthenia, to which many of the cases of railway shock are so nearly allied, is being obtained, even in the most extreme cases, by Weir Mitchell, Playfair, and many others."

In Chapter VI. Mr. Page discusses a class of cases occurring after railway and other injuries which he believes should be placed in the same category with those described so ably by Sir James Paget, under the designation *neuromimesis* or nervous mimicry of organic disease. Many of Mr. Eriksen's "spinal concussion" cases undoubtedly belong here—are functional or neuromimetic disorders. It must be said, in justice to this eminent surgeon, that he does not overlook the fact of such affections occurring in connection with railway cases. In Lecture VIII. of his work, under the head of *spinal anæmia, hysteria, shock, and unconsciousness, as consequences of concussion of the spine*, he recognizes fully the fact of the occurrence of hysterical and allied affections after railway accidents; he also discourses briefly on those forms of mental or moral shock in connection with those accidents. With Mr. Page, we believe, however, that he sometimes confounds cases of hysteria or neuromimesis with his concussion of the spine. With him, we also believe that very often these functional disorders are mistaken for real structural disease, and that they are very common after railway collisions, when the nervous system has been brought into that state which is the fit soil for their development and growth.

Sir James Paget's views of the existence of a peculiar nervous temperament in cases of hysteria or nervous mimicry, whether in connection with traumatism or arising independently of these, are reiterated and amplified by our author. Neuromimesis is a localized manifestation of a certain constitution.

"As to what is verily the peculiarity of the nervous constitution, I believe we have nothing fit to be called knowledge. It is even hard to give fit names to

what we may suppose it to be. We may speak of the nervous centres being too alert or too highly charged with nerve-force, too swift in material influence, or too delicately adjusted, or defectively balanced. But expressions such as these, or others that I see used, may be misleading. It is better for us to study the nervous constitution in clinical facts." (Paget.)

Chapters like these teach the great practical importance of investigations like those embodied in Dr. Tuke's work on the *Influence of the Mind on the Body*, although not written with any such intention. Many of the cases recorded by Mr. Page largely, if not entirely, psychical in their origin, are kept up or made worse by a mixture of hope and uncertainty as to the result of litigation threatened and impending, and are eventually cured by the mental influence of the settlement of the claim; nor are many of these cases unreal or undeserving of some compensation. It is difficult to make some hard-hearted and unemotional people believe to how great an extent fright, anxiety, and similarly mentally acting influences may produce serious temporary or even more or less permanent results. A series of interesting cases of functional or neurometric disorders following railway collisions are detailed.

Although not referred to by Mr. Page, Skey, in his admirable lectures on "Hysteria,"¹ as far back as 1866, forcibly called attention to these cases.

"The light of improved knowledge," he says, "will dissolve the mysteries which daily surround these cases in the form of supposed spinal concussions, partial paralysis, effusions into the theca vertebralis, thickening of the membranes of the brain, spinal cord, and lesions of this organ or that. These, as Dr. Sydenham declares, are but imitations and resemblances, and not realities, and that they deceive the multitude is undoubted. When real disease prevails, there is no difference of opinion among medical men as to its existence."

The chapter on Malingering is equally interesting with the other chapters of this interesting book. A distinction is clearly drawn between cases due to shock to the nervous system, neuromimetic disorders, and cases of malingering. The remarks about feigned and fictitious diseases in general are of value.

"Depend upon it," he says, "if a man has not known disease at the bedside, if from want of familiarity with disease he cannot rightly weigh and balance its different symptoms and signs, he will be almost certainly deceived when a case of fictitious disease comes before him."

The frequent assumption of injury of the "spine" by malingerers is pointed out in strong terms, and by apt illustrations.

A few hints as to the investigation of the oftentimes trying cases discussed by Mr. Page, may prove of service.

Take nothing for granted. Assume, without necessarily allowing the patient to know it, an attitude of scientific criticism. Carefully separate subjective from objective symptoms, and if, on close scrutiny, the latter are practically wanting altogether, a feeling of healthy scepticism should not be restrained. Let the first object be to determine whether or not any real organic lesion of the cerebro-spinal mass in its envelops has occurred. Always follow a systematic plan of examination, never jumping to conclusions; but investigating by successive steps for disturbances of sensibility and mobility; for reflex, vaso-motor, trophic, urinary,

¹ Hysteria, etc. Six Lectures delivered to the Students of St. Bartholomew's Hospital, 1866. By F. C. Skey, F.R.S. London, 1867.

sexual, ocular, and other changes. Once satisfied of the non-existence of serious organic lesion, next differentiate fraud or malingering from unconscious neuromimesis.

Mr. Page has not contented himself with a mere citation of authorities and arguments from general principles. Valuable original cases are found scattered through the book; and in an appendix he gives a carefully prepared table which contains, inclusive of those recorded in the text, two hundred and thirty-four cases. The table shows the sex and age of the patient, the nature of the accident, a general outline of the case, the date of settlement of claims, the time when last heard of after the accident, the condition at this period, the evidences of injury to the spinal cord and membranes, and general remarks. The cases forming the table are not selected. He simply has chosen the first two hundred and fifty cases of his note-book, and excluding therefrom those cases where injury had been sustained in some other way than in collision, two hundred and thirty-four remained.

If our author enforces one general truth more than another, it is that of the folly of trusting too much to appearances. He relates the following case: A man based a large demand for compensation from a railway company on stiffness of his elbow and inability to move his arm, the result of a collision. A verdict incommensurate with his expectations having been recorded, he threw up his arms and exclaimed: "My God! I'm a ruined man!"

Mr. Sergeant Ballantine, in his entertaining *Experiences of a Barrister's Life*, speaks of two cases in which he was engaged, and in both of which justice miscarried through trusting too much to appearances. These reminiscences are so appropriate to the subject in hand that we may be pardoned for recalling them in concluding this review.

"A gentleman named Glover was the plaintiff in the first of the two cases to which I have called attention. He had been, I believe, member for Reading, and, although no external injury was apparent, it was stated that he had received a serious spinal shock, and that the result might be fatal. His appearance, however, in the witness box did not support this idea, and his manner prejudiced his case exceedingly. It was finical and coxcombical, and many, of whom I confess myself to have been among the number, thought that he was not candid in giving his evidence; and the statements of the doctors, which gave a very grave aspect to the alleged symptoms, had in consequence less weight than they deserved. Lord Campbell took an unfavourable view, and evidently thought that there was gross exaggeration. The jury, coinciding in this opinion, returned a verdict quite inadequate to the injuries it truly represented. Within three months the unfortunate gentleman, a comparatively young man, died, and it could not be doubted that his premature death resulted from the effects of the injuries he had undergone, and which had been correctly indicated by the medical men."

"In the other case, tried, I believe, before the same judge, the plaintiff was brought into court apparently in a moribund state. He seemed scarcely able to articulate, and his limbs were without power or sensibility. According to the doctors, and I do not impugn their truth as to the fact, his powers of sensation had been tested by a needle, which had been inserted in his arm without his exhibiting any sign of feeling; in fact, he created general sympathy, and obtained a very large verdict amounting to many thousands. It was thought useless to move for a new trial. Within a week after the time had elapsed for doing so the plaintiff was recognized climbing Snowden in full activity and strength, and within the twelvemonth was presented with an heir who, thanks to his father having been so nearly killed, was likely to have something to inherit."

C. K. M.

ART. XVI.—*Saint Thomas's Hospital Reports*. New Series. Edited by Dr. ROBERT COREY and Mr. FRANCIS MASON. Vol. XI. 8vo. pp. xvi., 419. London: J. & A. Churchill, 1882.

THE Saint Thomas's Hospital Reports for 1882 is a goodly sized volume, and is freighted with a number of excellent clinical papers. Appended to it are the statistics for the years 1880 and 1881, the former having been crowded out of the preceding volume by the pressure of the work done for the International Medical Congress. But the volume before us is thus rendered doubly interesting by the diversity of the subjects of which it treats.

The opening article, on *Disease of the Aortic Valves probably originating in Malformations*, is from the pen of the late Dr. THOMAS B. PEACOCK, and has attached to it the additional interest of being probably his last contribution to medical literature. An appended plate shows the heart in cross-section, with a satisfactory indication of the post-mortem valvular appearances, which are thus described:—

“The right and posterior aortic segments were blended together, so that the aortic orifice had only two valves, and both of them were much thickened, and the united curtain dropped below the level of the other curtain, so that there was both obstruction to the flow of blood from the left ventricle into the aorta and regurgitation from the vessel into the ventricle.”

It is also a matter of interest to note the physical signs produced by this condition during life:—

“The action of the heart is tumultuous and visible over a large space; there is decided prominence in the præcordial region. The dulness on percussion begins at the second interspace, and becomes entire at the third. Laterally it commences to the right of the sternum, and extends beyond the line of the left nipple. At the base there is a systolic murmur, heard most distinctly at the right side and upper part of the sternum; it is short and rough, and is followed by a soft diastolic murmur, which is propagated down the course of the sternum. Toward the apex there is a creaky murmur, which is clearly of independent origin and may be presystolic. It is not heard posteriorly. There may be a slight purring tremor felt at the apex.”

Dr. Peacock concludes his paper by a *résumé* of the points which lead him to attribute the disease of the valves to malformation, or, at least, to changes in the condition of the valvular apparatus probably occurring during intra-uterine life.

Mr. OSBORN contributes a paper, entitled *Further Remarks on Anæsthetics*, concerning which his position as chloroformist to the hospital entitles him to speak. It is an addendum to a former paper published in the “Reports” for 1880. There is, however, in this paper very little that is new to us, save an enumeration of the advantages accruing from the use of the Clover Inhaler, which, according to Mr. Osborn, “has become now the favourite apparatus for the administration of anæsthetics in several of the London hospitals.” A description of the most approved form of this apparatus would have added to the value of Mr. Osborn's paper; all we are told is that its mechanism is so constructed “that it lies in the power of the administrator to give first nitrous-oxide gas alone, then a combination of gas and ether, and, finally, ether alone.” While the practical hints about the effects of the different anæsthetics and the methods of

administration are, as we have said, not very new, they lose nothing in the repetition, for Mr. Osborn is very clear and explicit in his directions.

One of the most interesting papers in the medical series is that by Dr. ORD, on *Some Cases of Paroxysmal Pyrexia simulating Ague*. Dr. Ord gives the notes of four cases in which the pyrexia was to all appearance not due to malarial poison, and the diagnoses were respectively: (1) Ulcerative Endocarditis (confirmed by subsequent autopsy); (2) Jaundice with Obstruction; (3) Syphilis; (4) Renal Calculus. In the first case the "shivering fits" were daily for a fortnight, then every other day, and then every third day. After admission to the hospital the patient had daily rigors for five weeks, when he died. There was on admission "a marked presystolic thrill over the impulse, a systolic murmur at the apex, conducted into the left axilla; and a fainter, apparently independent, systolic murmur over the aortic valve; the arteries were everywhere much thickened, and the pulsation of the brachials and radials was clearly visible." It is noteworthy that, during the whole period of his illness in the hospital, the liver and spleen remained large, and the spleen was tender for one week shortly after admission, facts which tended considerably to complicate the diagnosis. But the post-mortem examination showed that the heart was the main seat of disease, the following lesions being present:—

"(1) Pericardial effusion (15 oz.), with no deposit of lymph in heart or pericardium. (2) Dilatation of both ventricles with hypertrophy of the left. (3) The posterior set of chordæ tendinæ of the mitral valve were ruptured, their ends clubbed, and covered by dark clot. The endocardium showed a white tract where the free ends would have played against it. The rest of the valve was natural. There was no effusion in pleuræ; nothing but congestion and œdema in the lungs. (4) The liver was large, but not obviously diseased. (5) The spleen was large, much congested, and friable; there was an old infarct of considerable size near its lower border. (6) The kidneys were large and pale; on section being good specimens of the large white kidney of chronic Bright's disease."

Such were the lesions presented by this most interesting case; interesting because the diagnosis on the admission of the patient to the hospital seemed to lie between ague, suppurative phlebitis (for he had complained of pain in the left calf, which was swollen and tender), pyæmia, and ulcerative endocarditis, and it was not until he had been under treatment for some days that the diagnosis was finally refined down to ulcerative endocarditis. Dr. Ord refers the pyrexia to the "state of the mitral valve setting up from time to time excitement in the heart, and through the heart in the nervous system."

In the second case cited by Dr. Ord the regular period of intermission was eight days, but the diagnosis was clear from the first, as jaundice was markedly present, and the symptoms pointed "to the existence of gall-stones, probably impacted, either sticking in the vesical duct or not completely blocking the common duct; with this there was abundant evidence of gastro-duodenal irritation."

In the third case the diagnosis was obscure, but there was a specific history, and the pyrexia speedily disappeared after the exhibition of the iodide of potassium. In the fourth case the diagnosis was "ague," but upon the passage of a "stone" the size of a bean from the bladder, the fever abated, and there has been no return for six months.

The cases are all exceedingly interesting and instructive, as are the remarks upon them. Dr. Ord closes his paper by saying: "Two years ago

I witnessed the case of a distinguished Indian officer who had intermitting pyrexia, first attributed to malaria, next to hepatic abscess, and at last proved to be attributable to neither of them, but simply to impacted biliary calculus."

Mr. STONE contributes his notes of *A Case of Tricælian Heart with Insufficiency of the Ventricular Septum*, and the following synopsis of the physical signs and post-mortem appearances will be interesting:—

"There was a distinct systolic thrill over the cardiac region, most marked at a part half way between the left mamma and the sternum, and conveyed upwards in a diagonal line from the midsternal point toward the outer extremity of the left clavicle. This was accompanied by a loud rough sound, also systolic in rhythm, most accentuated at the point covering anatomically the origin of the pulmonary artery. It was not loud at the apex of the heart; was almost lost to the right of the sternum, but was audible over the upper part of the scapula posteriorly, and less distinctly lower down. The heart was somewhat enlarged toward the left side." The autopsy showed a "heart not excessively enlarged, the vessels springing from it quite normal. Ductus arteriosus not pervious. Water injected into the left ventricle through the aorta came out freely through the pulmonary artery. On inserting the finger through the pulmonary valves it met with an obstruction about an inch and a half beyond them. The auricles were normal as regards capacity and thickness of walls. They communicated by a slit-like fissure at the anterior edge of the septum, such as is not uncommon without producing any pathological effect. The walls of the right ventricle were hypertrophied to exactly an equal thickness with those of the left. The cavity of the ventricle was divided into two chambers, one much smaller than the other, and almost completely shut off from it by a firm fleshy partition. These two were in communication through a small circular aperture with cartilaginous margins, studded with vegetations the size of millet seeds, and about a quarter of an inch in diameter. The small oval chamber was an inch and a half long, situated between the general ventricular cavity and the pulmonary valves. These were quite healthy. The septum between the ventricles was perforated by a large semilunar orifice in its upper and undefended space."

Although there was no symptom of cerebral involvement, the brain was found to be considerably diseased, purulent inflammatory deposits extending over the pons and inter-pyramidal spaces, and an old abscess being found in the lateral surface of the right occipital lobe. The whole history is especially interesting, when taken in connection with the cases reported by Dr. Peacock, and already alluded to.

Mr. STONE and Mr. KILNER contribute two papers, one on *The Use of the Continued Current in Diabetes*, and containing the reports of two cases, the other on *Measurement of the Medical Application of Electricity*.

Dr. TAYLOR presents the *Analysis of, and Remarks on, Thirty-one Cases of Enteric Fever*, a paper which gives all the data connected with the cases treated in the Hospital during 1880–81. The prevalence of the fever during November is noted, and also a considerable diminution of cases during the succeeding four months. In 16.1 per cent. of the cases, the rash did not appear at all during their stay in the Hospital, whilst in one case "there appeared at the end of the twelfth week an eruption resembling the tache bleuâtre of the French authors, with the exception that it was elevated above the surrounding skin." This was in a prolonged, double-relapse case. With regard to the temperature, the writer says:—

"In ten cases only (almost one-third), of which two were fatal, did the thermometer register 105° Fahr., and in only three of these did the fever rise above this point. The highest recorded temperature was 105.6°, which occurred on the seventeenth day of the disease. The patient recovered. A highest temperature of 104° and below 105° was frequent, namely in 13 cases, or nearly a half,

with one death; whilst temperatures between 102° and 104° included 8 cases, or over a fourth. There was no highest evening temperature below 102° On the other hand, very low morning temperatures were frequent, for we find one with a record of 94° , five with 95° , and sixteen with 96° , or, in other words, 21 cases whose lowest morning temperatures were between 94° and 96° . Only one of these was fatal, a boy, aged twelve years, in whom the temperature fell suddenly from 102.4° to 96.8° at the date of perforation of the bowel."

Diarrhœa occurred in twenty-eight cases, but in eleven of these constipation had also existed at one or another period of their illness. The tongue was dry in eight cases, dry and brown in nine, and tremulous in four. Fissuring was noted in four cases. Albumen was detected in the urine of eight cases, but in six at least it was only temporary. Marked delirium occurred in eleven cases, in five of which "the greatest intensity of delirium or its very onset exactly corresponded in date with that of highest temperatures, and in three others the events were only two days apart. . . . In all cases in which delirium was severe the thermometer registered 105° or upwards." As regards the treatment for these high temperatures "quinine has been given with only partial success. It has undoubtedly controlled hyperpyrexia, but only very temporarily, and then only when given in such doses as produced effects which may be called toxic." Graduated baths were only administered in two cases, but with very marked effect on the temperatures.

The paper closes with an abstract of the cases of relapse, and may be regarded as a very valuable contribution to the literature of the subject.

Dr. HARLEY's paper on *Fæcal Retention, especially as it affects the Cæcum*, treats of a disease as common as it is slighted by most medical men—chronic constipation. He starts out with the old-fashioned assertions that "constipation is often the forerunner of enteric fever, and so far may be regarded as a factor of that disease. . . . Constipation is occasionally the sole cause of enteric fever." This is not exactly orthodox according to our present lights, but, however that may be, the eight cases which are cited are full of interest to the practitioner who has to fight numberless cases of this same sort in his general practice. Case I. was one of simple idiopathic constipation which had a fatal termination from a persistent neglect of the demands of nature. Case II. was a passive variety of the same condition, which readily yielded to appropriate treatment. Case III. was one of fecal accumulations in the cæcum inducing some of the symptoms of enteric fever. Case IV. was one of fatal constipation, without prominent symptoms, the patient being brought to the Hospital almost *in articulo mortis*, and the post-mortem examination revealing nothing of the nature of obstructive disease. Case V. was one of gradual constipation followed by the sudden appearance of symptoms of obstruction in the cæcum, but which yielded to appropriate treatment. Case VI. Constipation, acute pain in the right iliac region, vomiting after a hearty meal of whelks; fecal tumour of the cæcum, convalescence after twelve days—a case whose title sufficiently explains it. Case VII. Fæcal constipation, retention of the fecal matter in the cæcum, fever, etc. Case VIII. Constipation, followed by fever and stercoraceous vomiting, perforation of the stomach and cæcum. The history of these cases is very interesting, and will fully repay careful study.

Finally, Dr. BRISTOWE gives us an important paper on *Hydatid Tumours of the Abdomen and Tumours simulating them*: with the history of three cases, one of hydatid tumours in abdomen, associated with pregnancy; hydatid thrill in small hard tumour only; one of abdominal can-

cerous and hydatid tumours; and one of parovarian cyst simulating an hydatid tumour. The first case is especially interesting. The woman stated that she was three or four months pregnant, and "presented five obvious abdominal tumours, of which three were large, rounded, and elastic, and fluctuated more or less distinctly; and two were small, hard, and judging from palpation solid. . . . Two of the large cysts were successively punched, and from each of them was withdrawn the fluid characteristic of living hydatid cysts, in one instance hooklets of echinococci being discovered. The third cyst was also reserved for puncture, but the suspicion of pregnancy made a close examination necessary, and the stethoscope developed the foetal heart-sounds.

The Report ends with the usual statistical tables for both 1880 and 1881. R. P. R.

At the present time, when medical journals bring so promptly to every reader the latest facts and theories, and when they preserve so well whatever is worth recording, it seems a pity to bury in a volume of very limited circulation a paper which deserves to be widely read. Yet this has been the fate of many of those which from time to time have appeared in the large and valuable reports of certain English hospitals. It is true that these reports go out to a number of medical journals, and reviewers pick out and call attention to what is best in them. But, notwithstanding this, it is a sort of burial that a paper undergoes, which is lodged in one of these volumes. Sometimes, however, this is not so great a misfortune to the world as it is to the author—then the loss of one proves to be another's gain.

The volume before us suggests and exemplifies these reflections. When Mr. NETTLESHIP, for example, writes such a paper as here appears under the title *Cases of Orbital Cellulitis presenting unusual Features*, it seems a good saving of the reader's time that he should not be tempted by the writer's name to linger over what is so loose a commentary on such questionable cases. At the same time he will avoid the bad example of a teacher who, while treating eye diseases, records that a patient "says his water is very thick," and never examines that water to see why it is thick.

On the other hand, his report of eight *Cases of Injury to the Optic Nerve*, and such an interesting case as that of *Spondylolysthesis* simply recorded by ROBERT CORY, M.D., deserve more publicity than they get here: the former because of its instructiveness, the latter on account of the rarity of the condition described. The same may be said of the *Contribution to Pathology of Double Optic Neuritis* by WALTER EDMUNDS, M.D., which gives a very brief account—illustrated by a plate—of the gross and microscopical lesions found in the case of a girl, 8 years old, who was killed by being run over by a horse and cart, receiving, among other injuries, a fracture of the base of the skull. Though she died within twenty-four hours of the accident, the optic nerves were red and swollen just behind the orbit, and showed under the microscope early inflammatory manifestation between the two sheaths, and somewhat within the inner one. This case suggests some questions, not answered in the paper, which seem to us to be well worthy of the attention of neuro-pathologists.

HENRY GERVIS, M.D., writes *On Topical Applications to the Cervix Uteri during Pregnancy*, and urges the value of such a proceeding in

cases of threatened abortion due to endometritis, of the nausea of pregnancy, of pruritus, and of general uterine uneasiness.

Mr. H. G. ARMSTRONG gives an account of a remarkable result of *Nerve-stretching in a Case of Spinal Meningitis with Ataxic Symptoms due to Injury*. The patient, a man 40 years old, had a fall astride of a piece of timber. After lying by for a week he resumed work and had attacks of pain in the sciatic regions—whatever this may mean—and tetanic spasms, intermittent but increasing in severity and frequency. After two years he gave up work, and for three years before the operation grew worse, having had to spend the last year almost altogether, and the last four months altogether, in bed. At the time of operation he had "severe lightning pains confined principally to the legs and lower parts of the body, though they are occasionally felt in the upper extremities. . . . The lancinating pains and tetanic spasms in the lower limbs can always be produced by pressure on the skin over the coccyx. Does not attempt to leave his bed, as on trying to walk he falls down." His muscular action in his legs was violent and ill-coördinated, patella reflex absent; he had complete anæsthesia of both legs below the groin and absence of sexual power but not of desire. Muscular electro-excitability was only partially lost. Such being the condition of the patient, Mr. Armstrong cut down upon the *left sciatic nerve* below its exit from the sciatic foramen and stretched it violently. The operation was painless, though done without the use of any anæsthetic. In four days the patient's pains were "very slight," his tactile sensibility was returning in *both* feet. In eleven days this was established over the whole of both lower extremities. In sixteen days his legs were under full and steady control of his will. In twenty-nine days he could walk with "very slight assistance." Within two months he could walk out regularly, and soon took a walk of seven miles before breakfast. His sexual power was also restored. After six months he had some return of his intermittent pains, though they were much less severe than formerly, and in walking he exhibited the characteristic ataxic gait.

Jottings from the Surgical Out-patient Room, by H. H. CLUTTON, M.B.F.R.C.S., Assistant Surgeon to the Hospital, is a very interesting paper, giving an account of several cases. One was a *Fracture of the Clavicle by Muscular Action*, which came under the author's observation six months after its occurrence, and which had healed without surgical assistance. Another case was a *Large Vascular Growth in the Neck* of a baby 7 months old. It involved the floor of the mouth, dated from the child's birth, increased rapidly a few months after. It was brought for six weeks to the hospital and then died at home. No autopsy was obtained. It is noteworthy and unfortunate that nothing is said as to the treatment, and its effect, while the baby was under the author's care.

Three Cases of Nævi of the Face treated by Electrolysis are given. They illustrate the advantages of this method in nævi inaccessible to operation.

A Congenital Hydrocele of the Neck over the sterno-cleido-mastoid muscle, in a child 2 years old, was treated by tapping and injection of tr. iodini and water, in equal parts. After an interval of about two weeks this was repeated, and at the end of three months all that was left was a solid lump, about as big as a walnut, below the angle of the jaw.

The jottings close with an interesting account of a case of *Multiple Fatty Tumours* in a man 44 years old. The author makes a point of

their symmetrical distribution, and believes that such a distribution is so common that it may be regarded as indicating a law.

This paper, aside from its intrinsic value, is commendable as a utilization of a sort of material which is too often wasted in large hospitals. The more striking experiences of the wards are no more valuable to men in general practice, and yet how rarely does one meet with reports from outpatient departments.

The most curious surgical paper in the volume of reports is that by Mr. BERNARD PITTS, Resident Assistant Surgeon, *On Six Cases of Abdominal Surgery*.

Case I. was a woman forty-two years old, who had suffered with constipation for several months; nothing passed *per anum* for two weeks. There were present all the signs of intestinal obstruction. A central abdominal incision was made under spray, the hand introduced, and an annular stricture found at the junction of the sigmoid flexure with the rectum. An incision an inch long was now made "in the left groin," the sigmoid flexure was drawn into it and secured by silk sutures, the abdominal cavity was cleansed, the central wound closed, and both wounds dressed antiseptically. About fourteen hours afterward the dressing was cut away from the wound in the groin, the cut margin of the central dressing sealed by strapping dipped in carbolic lotion, and the bowel incised. Gas and eight ounces of dark fluid evacuation escaped, and feces continued to flow slowly for the next six hours. The patient made an uninterrupted recovery. Six months later she passed a "good deal" of her feces the natural way—the artificial anus being about the size of one's little finger.

The second case was one where a reducible left inguinal hernia, in a man forty-five years old, had become strangulated and reduced without the patient's knowledge. An exploratory abdominal incision was made and a knuckle of bowel that had been constricted found. As it looked recoverable, nothing else was done, but the abdomen was closed at once. In the evening the patient became delirious, and died.

The third case was one of strangulated right inguinal hernia, in a man also forty-five years old. He entered the hospital about six hours after his hernia came down, and he failed to reduce it. The next morning it was reduced by the surgeon. The bowel went back in the usual way, but "*without a definite gurgle*." After a short period of apparent amelioration symptoms of obstruction became pronounced, and Mr. Pitts cut down on and explored the sac, continuing his incision upwards and outwards on the abdominal wall for about three inches. Here a part of the large intestine was found to be ashy-gray and soft for about two inches of its length. This was brought down and fastened to the edges of the wound. An artificial anus formed; but the patient died ten days later of pneumonia and exhaustion.

The fourth case was one of congenital imperforate rectum, in an infant two days old. An attempt to open it through the perineum failed, and then the author opened the left groin and brought up the sigmoid flexure, fastened it to the edges of the wound, and opened it. All went well for a few days, but then the child did badly, and died at the end of sixteen days of surgical kidneys. At the *post mortem* the rectum was found to end in a small opening on the floor of the urethra, just in front of the veru-montanum.

The fifth case was one of a child four and a half years old, suffering with acute intussusception low down in the colon. Inflation with air was

about a case which might have proved very interesting in its details. In 1881 there was one case of perforating ulcer of the foot with diabetes, which ended fatally.

In 1880 there were 5 cases of tetanus treated, in two of which chloroform was given and tracheotomy done; both died. Chloral was used successfully in two cases and unsuccessfully in one. In 1881 there were 2 cases of tetanus; both died; in one morphia and chloroform were used, and in one bromide of potassium, nutrient enemata, and laryngotomy; fifteen minutes after which death occurred.

In 1880 there were 95 cases of erysipelas with 7 deaths; and in 1881 there were 104 with 12 deaths. One of the latter was developed in the hospital, in a man, after an operation for strangulated femoral hernia carried out under antiseptic precautions.

In 1880 there were no cases of pyæmia; in 1881 there were 5, all fatal. From this abstract it may be seen how interesting and instructive are these statistics, and how suggestive they are in regard to certain surgical disorders and their treatment. They are a very valuable contribution to the literature of surgery. They are not faultless, however. Perhaps this would be too much to expect. But, after making reasonable allowance for clinical errors and for the difficulty a registrar may have in reconciling the accounts received from dressers and internes, there remain here some defects which we think might be corrected without too much trouble, and the correction of which would add to the attractiveness and value of these reports. It may be regarded as a matter of taste entirely, but we do not fancy the expressions: "soft sore" and "smash of foot;" we find "crup-tion on hand" too vague; "lamboidal" is probably a misprint, but "Collis" (for Colles's) occurs too often to be so explained. We find the punctuation so defective, in a number of cases, as to leave us quite in the dark as to the real significance of the figures and remarks, and occasionally an "etc." upsets our calculations entirely. We find, by investigation, certain cases duplicated without sufficient indication of the fact. In other cases we find that the tables do not agree, and when we search for details of one statement, we are met with only apparent contradictions of it. We find no distinction of hemorrhoids as to whether they were internal or external. And, finally, we are a little surprised to meet among the "Trivial Cases" one of chronic otitis and meningitis, which resulted in the death of the patient.

So much by way of criticism, which we offer not without a pretty good knowledge of the great difficulty of keeping correctly and reporting satisfactorily the surgical records of a large hospital.

C. W. D.

ART. XVII.—*Guy's Hospital Reports*. Edited by H. G. HOWSE, M.S., and FREDERICK TAYLOR, M.D. Vol. XLI., pp. 515. London: J. & A. Churchill, 1883.

THE leading article in this bulky volume is a biographical notice of Joseph Towne, modeller to Guy's Hospital for fifty-three years, by Thomas Bryant, Senior Surgeon to the Hospital, from which it appears that this skilful artist became attached to the institution in 1826 when a lad of only

seventeen years old. His first work was, curiously enough, the modelling of a human skeleton, accomplished surreptitiously at night for fear of his father's displeasure, and by the advice of a friend he brought it from his native country village to London, and exhibited it to Mr., afterwards Sir Astley Cooper. That great man at once recognized in the rustic youth a true genius for such work, and immediately secured his services for Guy's Hospital, the museum of which seems to have been wonderfully enriched by his productions. Among the numerous examples of felicitous diction with which Mr. Bryant has adorned this memoir, it seems strange to find the following on p. 12: "Mr. Towne was married on September 20, 1832 . . . and left several children. He left also some models for disposal, the best of which were purchased for the museum of Guy's," etc.

A case of Phosphorus Poisoning which ended in Recovery under the Administration of Oil of Turpentine, reported by C. HILTON FAGGE, M.D., forms the second paper, and affords some confirmation of the value of this oil as a remedy as first suggested by Andant, whose detailed essay may be found in the *Annales d'Hygiene* for 1873. Although all the cases of acute phosphorus poisoning previously treated in the hospital had proved fatal, Dr. Fagge admits that the favourable issue in this instance should not be accepted as proof that turpentine is an effectual antidote, since several examples of recovery after hepatic enlargement, jaundice, and other severe symptoms appeared, are on record.

Dr. W. HALE WHITE next reports a curious *Case of Symmetrical Softening of the Corpora Striata*, followed by bilateral descending degeneration with secondary anterior poliomyelitis. This patient's malady seems to have quite baffled the diagnostic acumen of its reporter during life, and the only record of internal treatment is that of the administration of large doses of iodide of potassium, from which we may infer that the idea of some specific neoplasm to be absorbed rather than that of a degeneration to be arrested was entertained. The literature of the subject appears to have been pretty thoroughly studied.

In a short essay upon *Exophthalmic Goitre with Mental Disorders*, Dr. GEORGE H. SAVAGE relates the histories of three cases of Grave's disease complicated with insanity, and of some other instances where insanity was accompanied with one or more symptoms of exophthalmic goitre. Savage asserts that but few cases of fully developed insanity with this variety of goitre are on record, although his experience shows that Grave's disease is more common among the insane than among the sane, and that in the former case the mental symptoms are apt to be of a melancholic order. Under these circumstances there seems to be something special in the type of insanity to which, however, Savage is unable to give any distinctive characteristics in writing, except that the melancholia is of a suspicious kind, followed by mania of a very violent nature, with a tendency to emaciation and death.

The next article is entitled *Cases of Empyema in Children treated by Removal of a Portion of Rib*, by W. ARBUTHNOT LANE, B.S. It is founded upon five cases, three of which were successful, the other two proving fatal on the eighth and twenty-second days respectively. Lane advocates the free use of hypodermic punctures over the surface area of a supposed pus cavity in the chest, in order to determine its size and depth; and great care in securing an aperture at the lowest point in order that the whole of the pus may be promptly drained off, and the employment of a large, soft rubber drainage tube for the purpose of securing a continued

free discharge. His experience with the method of preserving the periosteum has been quite favourable, no excessive formation of osseous material having obstructed the artificial outlet in any of these instances.

Drs. R. E. CARRINGTON, P. HORROCKS, and W. H. WHITE give in the succeeding paper an account of the *Abnormalities observed in the Dissecting Room of Guy's Hospital, during the Sessions 1880-81 and 1881-82*, these being detected in the pursuit of practical anatomy upon 181 subjects. Among numerous minor abnormalities of the muscular system the most important seems to be a muscular slip about three inches long over the right popliteal space, without osseous attachments, which may have been either a slip from one of the hamstrings or a third head to the gastrocnemius. A curious arterial anomaly was the giving off of the innominate artery on the left side of the trachea, which it crossed about an inch above the sternum, of course, in a situation where it might render the operation of tracheotomy immediately fatal. Numerous less important variations in sundry parts of the arterial, venous, and nervous systems were noticed, and in one instance a kidney (Fig. 13) was found in an abnormal position, lying diagonally across the left sacro-iliac synchondrosis and partly projecting into the cavity of the pelvis.

Two Cases of Pulsatile Tumour at the Root of the Neck are described by C. H. GOLDING-BIRD, and F. A. MANONED, M.D. One of these was an aneurism accompanied by peculiar symptoms, and the other was a post-sternal abscess which simulated aneurism. The great interest of this paper lies in the fact that by the aid of the sphygmograph Dr. Mahomed arrived at a correct diagnosis in each instance on a first examination, and maintained it throughout, in spite of the conflicting opinions of several eminent medical men who examined the patients at different periods. Dr. Golding-Bird deserves great credit for the honest frankness with which he records the error into which he was led, notwithstanding his careful and faithful study of the history, signs, and symptoms in the latter of these obscure cases.

The first long article in this volume is a treatise on *The Surgical Affections of the Tongue*, by THOMAS BRYANT, written with the purpose of doing something towards filling the gap (as the tongue always does) left by scanty notice of diseases involving this important organ in previous numbers of the Hospital Reports. This paper is illustrated with two superb coloured lithographic plates, and also by three pages of lithographs representing microscopic appearances of some of the morbid growths described. These latter suggest that the drawings have been made under lenses sadly wanting in definition, and leave much to be desired in the way of clearness.

Among congenital affections of the tongue hypertrophy or macro-glossia is represented by two instructive cases, the first of which in a boy was repeatedly relieved by mercurials, and the other in a young man was cured(?), although of twelve years' standing, in a week by ten-grain doses of iodide of potassium. Several examples of nævi and other congenital tumours of the tongue are given; most of these were operated upon, but in one remarkable instance which was not interfered with, cystic degeneration took place resulting in a great amelioration of the condition of the child by the time she reached her twelfth year.

After discussing inflammation and simple ulcer of the tongue Bryant considers at length syphilitic and tubercular ulcerations, cancer of the tongue (in which he strongly advocates operation, and records one instance where

the disease did not return until fifteen years later), and concludes his valuable monograph with notice of that peculiar affection, ichthyosis of the lingual organ, which he has seen benefited by arsenic when not too far advanced, but believes in its confirmed stage must be treated by excision.

Mr. SAMUEL WILKS contributes a very interesting paper *On Hemianæsthesia*, in which he records several curious cases of real or supposed brain lesions associated with this condition, including one of a Frenchman who was for a time a patient in Guy's Hospital, and after being discharged much improved suffered a relapse, from which he was "miraculously cured" by immersion into the waters of the holy well of Lourdes, in conjunction with the devout prayers of the Archbishop of Cambrai and numerous followers. Wilks also relates some experiments to test the value of the new system of "metallotherapie," the result of which will by no means satisfy its ardent Gallic advocates.

In a brief essay upon *Saturnine Lunacy*, Dr. JAMES F. GOODHART recounts the histories of four patients suffering from this malady, and admirably indicates the importance, from a therapeutic point of view, of diagnosing this little known affection from delirium tremens and from general paralysis, diseases which, at different stages of its course, it may very closely resemble.

In the next article upon *Acute Gonorrhæal Rheumatism*, Mr. J. N. C. DAVIES-COLLEY takes occasion to correct the views he expressed some four years ago in the *Obstetrical Journal*, and informs us that he no longer considers the variety of the disease then described peculiar to women, as he has since observed it in three individuals of the male sex. This form Davies-Colley believes is characterized by its appearing during the acute stage of gonorrhœa, attacking at the outset several joints, and afterwards centring in one, most frequently the elbow-joint, and by its affecting especially the fibrous tissues of the articulation, and only secondarily the synovial membrane and cartilages. The affection is not amenable to ordinary anti-rheumatic remedies, the best treatment being to cure the discharge, keep the part perfectly still, apply uniform pressure during the acute stage, and when that terminates resort to passive motion.

Mr. W. H. A. JACOBSON furnishes a thoughtful paper *On the Minute Anatomy and Origin of the Enchondromata of the Salivary Glands*, in which, after a concise account of the position, external characters, structure, and treatment of these unsightly neoplasms, Jacobson advances some interesting arguments partly derived from embryological studies of the jaw and ear, etc., in favour of Cohnheim's ingenious theory that the main source of origin for tumours consists in certain relics of fetal tissues, which, owing either to their being superfluous or to their development being arrested, have never reached maturity, but have remained quiescent in the midst of better developed structures. It must be remembered, however, that plausible as this hypothesis is, it remains as yet entirely without proof, which will from the nature of the case always be difficult, if not impossible, to obtain. The essay is imperfectly illustrated by two lithographic plates, one purporting to represent the microscopic and the other the macroscopic characters of these formations.

The longest article is furnished by Dr. P. H. PEE-SMITH, and is entitled *Reports of a Case of Idiopathic Anæmia of Addison*, since called essential, pernicious or progressive anæmia, with a commentary and tables of selected cases. It forms a valuable contribution to the literature of this obscure and remarkable malady, but is too extended for abstract in

our present notice. Dr. Pye-Smith gives tables of: A, 7 cases of fatal and probably idiopathic anæmia, recorded before Addison's description of the disease in 1855; B, 103 selected cases of idiopathic anæmia, followed by death and autopsy, recorded since 1855; and C, 20 cases of recovery from idiopathic and profound anæmia. In regard to treatment Pye-Smith states that he has lost all confidence in iron and phosphorus, but has seen marked benefit follow the administration of arsenic, and temporary improvement result from transfusion of blood. This paper should be studied by every medical practitioner having an obscure or doubtful case of anæmia under his care.

Dr. THOMAS STEVENSON's case of *Poisoning by Aconitine* is the celebrated one of G. H. Lamson, an alleged medical graduate of one of our American colleges, who was convicted and executed for the murder of his brother-in-law, Percy John, in 1881. The rarity of fatal poisoning by aconitine, the combined ingenuity and stupidity of the criminal, and the novelty of some of the points raised in the examination and trial, will doubtless render this case, as Dr. Stevenson anticipates, the leading one on this subject, in forensic medicine, for many years to come. The fatal dose of two grains of Morson's (?) aconitine was probably administered in one of the gelatine capsules so commonly used here in America for the purpose of avoiding the taste of nauseous medicines, and death resulted, after great suffering, in about four hours. The tests relied upon were the effect upon the tongue of the analyst, the reaction with phospho-molybdic acid, and the physiological tests upon mice, which were found to be more satisfactory than frogs for this purpose. One-thirteenth of a grain of the alkaloidal extract obtained from one and a half fluidounces of the urine, in this instance, was so skilfully manipulated by Dr. Stevenson that after it had been tasted by three persons, and tested specifically for morphia and strychnia, the residue sufficed to kill two mice when injected beneath the skin of the back, with all the symptoms of aconite poisoning.

Dr. C. H. GOLDING-BIRD's paper, *Laboratory Notes on the Working of the Histological Class*, contains much of interest to instructors in this important department. His answer to the question, "What is the easiest way of getting sections of tissues for the microscope?" which is commonly put to him, not only by present, but by past pupils, appears to be briefly: Harden the tissue in one-quarter per cent. aqueous chromic acid solution; then soak in gum mucilage, and cut sections by the aid of the freezing microtome. The best form of this instrument is, he asserts, that of Williams, where the freezing mixture is ice and salt; but although "the best," this apparatus has been superseded by Grove's modification, in which ether is employed. The staining materials used are eosine, picro-eosine, and logwood solution. Eosine, he declares, "is no good alone," but in conjunction with hæmatoxylin answers well. The course includes, we are pleased to observe, lessons upon development, as illustrated in the embryo chick, to furnish specimens of which, eggs are incubated as recommended by Balfour and Foster.

Cases of Paralysis of the Abductors of the Vocal Cords, by Dr. FREDERICK TAYLOR, comprise interesting reports of six examples of this affection, coming under Taylor's notice in Guy's Hospital during the last two or three years, with comments upon their respective peculiarities. Two of these instances in which recovery took place are of value, as demonstrating the fact "that dyspnoea and inspiratory stridor, from approximation of the vocal cords, may occur as a temporary affection, which is not

spasmodic, and has not for its remote cause an organic lesion, but probably some condition of nerve-failure, as hysteria or exhaustion."

A long article describing thirteen *Cases of Multiple Small Abscesses of the Liver*, by Dr. R. E. CARRINGTON, is apologized for on account of unnecessary prolixity of detail, because Carrington wished to make the histories complete, in order that their obscurity from a clinical point of view might be apparent. From an instructive analysis of these reports we find that the duration of illness was very variable, running from five to eighty days; that wasting of the body was always a prominent symptom; that abdominal distension was present in eight out of eleven cases; that the liver was enlarged in every instance save one; vomiting occurred in half the cases; rigors were common; and an irregular febrile movement almost universal. Carrington states that ten of the examples were of infective origin, but no microscopical examination of the smaller foci of inflammation to determine the presence of pyæmic micrococci in the intra-lobular vessels appears to have been attempted. We would strongly urge our author to undertake such an investigation at the first opportunity which may fall in his way in the future.

An illustrated paper on *Pes Valgus Acquisitus; Pes Pronatus Acquisitus and Pes Cavus*, by Mr. C. H. GOLDING-BIRD, without containing much that is new, does really, as Golding-Bird hopes, tell much that will bear repetition, both on account of its clinical interest and with respect to treatment. Golding-Bird's results in cases of acquired pes pronatus, from a simplified modification of Barwell's apparatus, with an artificial India-rubber "tendon" to draw up the arch of the foot, appear to have been eminently satisfactory.

Another essay by Dr. THOMAS STEVENSON, the industrious lecturer on medical jurisprudence at Guy's, has for its subject *Lead Poisoning*, giving some useful facts in regard to saturnine-water contamination, and reports the first English case of death from the homicidal administration of lead acetate, all of which will be perused with advantage by those of our readers who take an interest in forensic medicine.

The last monograph is by Dr. W. A. BRAILEY, and treats of that somewhat neglected subject, *The Vitreous Body in its Relation to Various Diseases of the Eye*. It gives the results of numerous observations upon the consistency, size, general appearances, and microscopical characters of the vitreous as found in excised eyes, and exhibits a praiseworthy effort to make the best use of opportunities for investigation which comparatively few observers enjoy.

Lists of prizemen, members-elect of the Royal College of Physicians and of Surgeons, appointees, etc., conclude the volume, which testifies to an amount of faithful and diligent medical work of which its illustrious staff may well be proud.

J. G. R.

ART. XVIII.—*Sanitary and Statistical Report of the Surgeon-General of the Navy for the year 1881*. 8vo. pp. 684. Government Printing Office: Washington, D. C., 1883.

THE medical corps of the navy, including all grades of the "active list," consists of 168 officers, each of whom has been carefully examined,

before appointment, in reference to his professional, moral, and physical fitness to discharge the duties of his office. These gentlemen are far better qualified as general practitioners when admitted into the navy, than the average of graduates of our medical schools when they begin to practise. The Surgeon-General begins his report with a statement, substantially, that they ably perform their duties, and that a desire to increase their own professional efficiency is common among them. For this reason it is his pleasure to encourage them to cultivate medical science, by placing within their reach whatever facilities and indulgence he is able to command. Medical men thus characterized should be accurate observers; and, therefore, their contributions to medical literature should be entitled to confidence.

In a general way, the results of their work are the materials of the Report of the Surgeon-General.

The amount of money estimated to be needed in the Medical Department of the Navy for the year ending June 30, 1884, and the condition of the Naval Hospital fund are stated in detail; and, next, that 65 cases from the navy have been treated during the year in the Government Hospital for the Insane, and that 50 cases remain, including 6 officers in the number.

Of the *entire force*, including 469 remaining from the preceding year, 14,013 cases of disease were treated. Of these, 11,863 recovered; 1345 were sent to hospitals, 308 discharged from the naval service, 97 died, and 400 remained under treatment at the end of the year. The average daily sick-rate was 457.33, and the average duration of treatment of each case was 11.91 days.

Considered in connection with the fact that all persons in the naval service are "selected lives," the sick-rate and mortality seem to be large. After due examination at the date of enlistment, every recruit is pronounced to be in good condition of health, and free from manifest sign of hereditary or acquired predisposition to disease. Of 6792 adults and 2015 minors examined, 1967 of the former and 783 of the latter were rejected; that is, thirty-one per cent. of the examinees were found not physically qualified for the naval service. The numerous causes assigned for rejecting candidates are classified and appropriately detailed in a tabular form, which covers nearly three pages. *Constitutional diseases* are assigned for the rejection of 151, of which 115 were syphilis; diseases of the eye, 590; diseases of the *circulatory system*, 364; of the *digestive system*, 456; of the *genito-urinary system*, 142; and on account of *defective development*, 661. These rejections imply that at least one class of the working population of the country contains a large percentage of males who are more or less disqualified by physical defects and diseases to depend upon their own labour for a livelihood; and that, sooner or later, they will be objects of public charity.

The *FORCE AFLOAT* was 9546. The number of cases treated was 9483, or 993.4 per thousand; of which 8278 recovered; 964, or 100.94 per thousand, were sent to hospital; 36, or 3.78 per thousand were invalided from the service; 28, or 3.03 per thousand died; and 176 were continued to the next year.

The admissions to treatment in the Prussian [German?], Austrian, and English navies were respectively 1369.4, 1006.36, and 1172.36 per thousand; the invaliding 99.2, 38.80, and 31.11 per thousand; and the death-rate 2.5, 7.60, and 12.57 per thousand.

A comparison of the relative health of our squadrons shows the admis-

sion-rate of the North Atlantic to be 16.83 per cent.; the Asiatic, 23.70 per cent.; the South Atlantic, 24.81 per cent.; the Pacific, 25.52 per cent.; the European, 27.08 per cent.; and special service, 35.16 per cent. The details are given in a table.

The number of cases of each disease of the classification followed is next given, with a table of details, which occupies ten pages.

Next are presented notes on the *influence of age upon morbidity*, illustrated by a graphic table showing the prevalence of diseases at the different decennial periods and for all ages between 15 and 55 years. This is followed by a table of twenty pages, "showing the number of cases of disease and injury, the number invalided and dead, in decennial periods, with rates per thousand of force at those periods."

The mean force, 9546, is grouped in five decennial periods; in the first, from 15 to 25, are 4191 men; in the second, between 25 and 35, are 3385 men; in the third, between 35 and 45, are 1398 men; in the fourth, between 45 and 55, are 446; and in the fifth are 126 men above 55 years of age.

The death-rate is highest in the fourth decennial period, less in the third, still less in the second, and least in the first. This death-rate corresponds in a general way with the mortuary returns of Philadelphia for 1880.¹

Under the head of "Sanitary Investigations," studies of different organisms found in air-dust, by Passed Assistant-Surgeon T. H. Streets, follow. The paper is illustrated by two heliotype plates, one of *Bacillus subtilis* and one of *B. ruber*.

The report of a board appointed to examine the proposed site of the new Naval Observatory, with reference to its salubrity, is given under the same head. The board carefully examined the topography, buildings, water supply, drainage, soil, and air. Its report, in which chemical analyses and microscopic observations are detailed, is illustrated by seven wood-cuts and four heliotypes, representing Bacteria from water through which air had been passed: Bacteria from sediment of well-water; *Bacillus subtilis* from well-water, and organisms from atomization of ground air. "After a careful examination of the 'new observatory site,' the board is of the opinion that it is, from a sanitary point of view, a fortunate selection; and that it can become an unhealthy place of residence only in consequence of the neglect of simple sanitary precautions in the future."

The naval force is employed in different regions. Limits are arbitrarily assigned to them. They are called stations, and each is designated by a name. Having treated of the entire force, of the force afloat, recruiting, etc., the Surgeon-General then considers in detail the force employed on each station, beginning with the "sanitary condition of the North Atlantic Station." This includes a region which lies between the coast and the forty-third meridian of west longitude, extending from the equator to fifty-five degrees north latitude. An outline map of the station is given.

The mean strength of the North Atlantic Station was 5000 for the year 1881, distributed in 37 vessels, of which 12 were active cruisers, 9 practice and training ships, 5 receiving ships, 3 survey vessels, and 8 iron-clads in ordinary. The admissions of sick were 911.80 per thousand; discharged recovered, 761.8 per thousand; invalided to hospital, 132.2 per thousand; from the service, 2.6 per thousand; died, 2.6 per thousand.

The sick-rate per thousand in each vessel is given in a table for three

¹ Report on Meteorology and Epidemics. By Richard A. Cleemann, M.D. Transactions of the College of Physicians of Philadelphia, third series, vol. vi. 1883.

years, including 1881, showing, by comparison, marked improvement in the health of this station. The average loss of service per thousand from the several classes of disease is set forth in the same manner. A table shows the classes of disease on account of which patients were transferred to hospitals; another, arranged in the same manner, the causes of invaliding from the service. A table exhibiting the invaliding in each of the vessels, with the ratios for the preceding year, is given; also, one of the number of deaths, with the classes of disease to which they were ascribed, and the mortuary rate per thousand.

Next follow a table of the number of the cases per thousand in each vessel for the years 1879, '80, '81; and then a statement of the number of cases of each disease. The results of 3358 vaccinations are given in a table which shows the per cent. of successful cases.

The number of cases of each disease of each class is stated, and for some of the classes of disease a table of the ratios per thousand of cases occurring in each ship is given for the years 1879, '80, '81, showing the prevalence of the class.

Under "Naval Hygiene" is given an outline of the sanitary condition and cruising of each vessel, arranged in succession according to name, in alphabetical order, beginning with the *Alarm* and ending with the *Yantic*. A graphic chart, showing the presence of parts of carbon binoxide to the one thousand in the atmosphere of the interior of the ship; the relative humidity; the percentage of sick, excluding injuries; average strength; average temperature; number of days of snow or rain; number of days on which the berth deck was washed; and the ports visited in every month of the year, is given. Twelve such charts illustrate the hygienic condition of vessels on the North Atlantic Station.

"Hygiene" is succeeded by "Medical Topography and Sanitary Reports," from Surgeon G. F. Winslow, of the *Vandalia*, Passed Assistant-Surgeon H. C. Ecksteine, of the *Alliance*, and Passed Assistant-Surgeon H. Aulick, of the *Despatch*.

Tables, covering 112 pages, in which the whole matter is classified and numerically detailed, closes the report for the North Atlantic Station.

The sanitary condition of the South Atlantic, of the Pacific, of the European, and of the Asiatic stations; of vessels on special service; of naval hospitals; and of naval stations or navy yards, is presented in the same manner. The volume is closed with an admirable "Report on the Pharmacopœias of all Nations," by Surgeon J. M. Flint.

The illustrations consist of five maps to show the limits of the stations, nineteen graphic charts, six heliotypes, and seven wood-cuts. The tables, exclusive of those intercalated in the text, occupy 378 pages. The computations requisite to construct these very full and extensive tables, involve very considerable labour. Whether their results are at present a compensation or not for the work and time they must have cost, it is very probable that in the future, when like data shall have been gathered and tabulated for ten or fifteen years more, they may be a source of information of much value to the navy, and of much interest to the medical profession. At this time, however, a study of these great tables is not likely to be attractive or profitable to medical students who are not employed in naval or maritime medical service. There can be no doubt, however, that Surgeon-General Philip S. Wales is entitled to general commendation for his industrious efforts to secure a faithful and accessible record of the sanitary statistics of the navy. In this particular he is in advance of his predecessors in office. The example of his industry and active interest

in the progress of medical science should exercise a beneficial influence on those whose professional work he leads and generally directs. But a comparison of the number of practitioners, 168, with the number of cases treated, 14,013, suggests that too few fall to the care of one to hold his mind closely to the consideration of medical subjects; and that for lack of professional work he may easily drift into collateral science, general literature, or even into the idle enjoyment of leisure whenever opportunity offers, just as his innate proclivity, or training, or taste, may invite. How to guard against such aberrations, and impart to every member of his corps zeal to labour within the limits of the profession, with little professional work to do, seems to be a problem not yet solved. Remembering the high qualifications claimed, and the opportunities afforded to them in every part of the world for observation in medicine, in the collateral sciences, etc., the medical officers of the navy, as a body, have contributed less to the common stock of our knowledge than could have been perhaps reasonably anticipated. Comparatively few have attempted to do more than the faithful and efficient performance of routine duties require, and beyond this we have no right to insist upon their doing. Yet, it is admitted, spontaneous, volunteer labours have produced most admirable results, and won for the labourers enviable reputation.

W. S. W. R.

ART. XIX.—*A Treatise on Insanity in its Medical Relations.* By WILLIAM A. HAMMOND, M.D., Surgeon-General United States Army (Retired List); Professor of Diseases of the Mind and Nervous System in the New York Post-Graduate Medical School; President of the American Neurological Association, etc. 8vo., 767 pages. New York: D. Appleton & Co., 1883.

It is a remarkable fact that the authors of the only systematic treatises on insanity which have yet appeared in this country have not been connected as superintendents with any of our asylums or hospitals for the insane. These works, three in number are (1) *Medical Inquiries and Observations upon the Diseases of the Mind*, by Dr. Benjamin Rush, published in 1812; (2) Dr. Hammond's *Treatise on Insanity*, the subject of the present notice; and (3) a work on *Insanity; its Classification, Diagnosis, and Treatment*, by Dr. E. C. Spitzka, which has also just appeared. The late Dr. Isaac Ray, for many years superintendent of a New England asylum, was the author of three valuable works, namely, *Mental Hygiene*, the *Medical Jurisprudence of Insanity*, and a volume of *Contributions to Mental Pathology*, but neither of these books was a general treatise on insanity. We simply note the curious fact without attempting to explain it.

The author says of himself in his preface that, although he cannot claim to have seen as many cases of insanity as an asylum superintendent, yet a single case thoroughly studied is worth more as a lesson than a hundred that are simply looked at, and often from afar off.

The manner in which he has made use of his personal experience in giving illustrations of the various forms of insanity is certainly noteworthy; and in numerous instances histories of patients by themselves, their relatives, or friends, are given, and add interest to the pages. The case-books of Dr. R. L. Parsons, late the medical superintendent of the

New York City Lunatic Asylum, have also been drawn upon for much interesting original material. We believe that the prominence which has been given by Dr. Hammond to the recital of illustrative cases will do much to stimulate more careful and elaborate note-taking in our institutions for the insane.

Dr. Hammond's work is divided into four sections. Section I. treats of the general principles of the physiology and pathology of the human mind; Section II. of instinct, its nature and seat; and Section III. of sleep; Section IV. is occupied with the description and treatment of insanity, and constitutes about two-thirds of the book. In the first section subjects of the utmost importance to one desiring to take up the further study of insanity are discussed—the nature and seat of mind, and its divisions, eccentricity, idiosyncrasy, genius, habit, age, sex, etc. The discussion of instincts and sleep, although highly instructive and entertaining, has been carried out at too great length for a practical treatise on insanity. The chapters on sleep and dreams are largely reproductions of a former work by the author on sleep and its derangements. He says that a knowledge of the physiology and pathology of this function should form the groundwork of the study of insanity.

Dr. Hammond's definitions are generally clear, direct, and of no uncertain sound. Mind is a force produced by nervous action, and in man especially by the action of the brain. He divides this force into sub-forces—perception, intellect, emotions, and will. Perception is that part of the mind whose office it is to place the individual in relation with external objects. It is the starting-point of all ideation. Dr. Hammond holds that there are reasons for believing that all sensations are formed in the optic thalami. He devotes but little space to the discussion of the intellect, a defect, considering the prominent place which intellectual insanities hold in his classification. He holds the intellect to be that mental region where perception is resolved into an idea. An emotion is that pleasurable or painful feeling which arises in us in consequence of sensorial impressions or intellectual action. The will is that mental force by which the emotions, the thoughts, and the actions are controlled. The diagrams showing the connection of an organ of special sense with its perceptive ganglion, and the mechanism of the development of ideas, emotions, and volitions, are very simple, but none the less useful and instructive.

The definition of insanity occupies so much attention in many of our trials, where insanity is plead for the criminal, that we will quote Dr. Hammond's definition.

"Insanity is a manifestation of disease of the brain, characterized by a general or partial derangement of one or more faculties of the mind, and in which, while consciousness is not abolished, mental freedom is weakened, perverted, or destroyed."

He speaks in flattering terms of the definition proposed by Dr. Thomas K. Cruse, namely, that "insanity is a psychic manifestation of brain-disease;" but suggests adding to it the words "unattended by loss of consciousness," making it read, "a psychic manifestation of brain disease unattended by loss of consciousness." We agree with him that this definition is an admirable one.

We will also give entire the classification of Dr. Hammond, as it is an attempt to embrace all well-established varieties of mental alienation, and will, therefore, at a glance give some idea of the present status of psychiatry. The author holds that a system of classification should not only,

as far as practicable, embrace all well-established varieties of mental alienation, but it should also, at least, make the attempt to arrange them in groups, according to whatever philosophical idea may exist in the mind of its author.

"The system adopted may be wrong, it may be artificial and strained, it may lack exactness and sharpness, in its boundaries, but nevertheless it is better than none, and will at least, by exciting thought in the mind of the reader, lead to discussion, and, perhaps, a better system."

The classification is as follows :—

I. *Perceptual Insanities*.—Insanities in which there are derangements of one or more of the perceptions.

- a. Illusions.
- b. Hallucinations.

II. *Intellectual Insanities*.—Forms in which the chief manifestations of mental disorder relate to the intellect, being of the nature of false perceptions (delusions), or clearly abnormal conceptions.

- a. Intellectual monomania with exaltation.
- b. Intellectual monomania with depression.
- c. Chronic intellectual mania.
- d. Reasoning mania.
- e. Intellectual subjective morbid impulses.
- f. Intellectual objective morbid impulses.

III. *Emotional Insanities*.—Forms in which the mental derangement is chiefly exhibited with regard to the emotions.

- a. Emotional monomania.
- b. Emotional morbid impulses.
- c. Simple melancholia.
- d. Melancholia with delirium.
- e. Melancholia with stupor.
- f. Hypochondriacal mania or melancholia.
- g. Hysterical mania.
- h. Epidermic insanity.

IV. *Volitional Insanities*.—Forms characterized by derangement of the will, either by its abnormal predominance or inertia.

- a. Volitional morbid impulses.
- b. Aboulomania (paralysis of the will).

V. *Compound Insanities*.—Forms in which two or more categories of mental faculties are markedly involved.

- a. Acute mania.
- b. Periodical insanity.
- c. Hebephrenia.
- d. Circular insanity.
- e. Katatonia.
- f. Primary dementia.
- g. Secondary dementia.
- h. Senile dementia.
- i. General paralysis.

VI. *Constitutional Insanities*.—Forms which are the result of a pre-existing physiological or pathological condition, or of some specific morbid influence affecting the system.

- a. Epileptic insanity.
- b. Puerperal insanity.
- c. Pellagrous insanity.
- d. Choreic insanity, etc.

VII. *Arrest of Mental Development*.

- a. Idiocy.
- b. Cretinism.

Some of the forms of insanity here given an abiding place—such, for instance, as hebephrenia, katatonia, aboulomania, etc.—may be new to many, although not unfamiliar to those acquainted with recent neurological and psychiatric literature. Hebephrenia is the term applied to the insanity of pubescence, a form of mental derangement which presents many characteristic features, and which, as the name implies, is peculiar to that period in both sexes when the organism is undergoing the changes incident to full development. Katatonia is a form of insanity characterized by alternate periods supervening with more or less regularity, of acute mania, melancholia, and epileptoid and cataleptoid states, with delusions of an exalted character and a tendency to dramatism. Aboulomania is a term proposed by Dr. Hammond to describe a form of insanity characterized by an inertness, torpor, or paralysis of the will. Billod first called attention to this condition.

The article on reasoning mania is one of the most interesting in the book, although the profession and public have already become familiar with it during the notable discussion on the case of Guitau. This case of Guitau is the first of reasoning mania in which the brain has been examined. The patho-anatomical condition was practically that of incipient general paralysis.

Dr. Hammond's presentation of such medico-legal subjects as sane and insane delusions, lucid intervals, etc., is of such character as to make the book of value as a work of reference in the jurisprudence of insanity. His views with reference to the question of lucid intervals are that full complete intervals in the course of an attack of insanity, during which the individual is well, and would so be pronounced by competent observers, are exceedingly rare; and that they are only to be found in recurrent mania and a few other forms of insanity. Remissions are common enough, but a remission is not a restoration to health, and the patient in whom it is exhibited ought not to be regarded as being possessed of legal responsibility.

Minor defects, and even some of considerable magnitude, are to be found; but they are not such as to mar the work as an exponent of modern mental medicine. A careful condensation of opinions would sometimes have been better, rather than the multiplication of too lengthy quotations. Closer discussion of disputed points would often have been more profitable than repetition of illustrations, however interesting the latter.

Even in the chapter on treatment the entertaining is not absent, as where, for instance, the author recounts the so-called "moral" treatment of Leuret, which consisted in reasoning with the patient relative to the falsity of his delusions, and if he persisted in maintaining them, notwithstanding the arguments adduced, of subjecting him to the cold douche on his head and body generally till he announced that he was convinced.

The times are ripe for a new work on insanity, and Dr. Hammond's great work will serve hereafter to mark an era in the history of American psychiatry. It should be in the hands of every physician who wishes to have an understanding of the present status of this advancing science. Who begins to read it will need no urging to continue; he will be carried along irresistibly. We unhesitatingly pronounce it one of the best works on insanity which has yet appeared in the English language.

C. K. M.

ART. XX.—*Chirurgie Orthopédique. Thérapeutique des Difformités congénitales ou acquises.* Par le Dr. L. A. SAINT-GERMAIN, Chirurgien de l'Hôpital des Enfants-malades. 8vo. pp. 7, 651. Avec figures. Paris: J. B. Ballière et Fils, 1883.

Orthopædic Surgery. Treatment of Congenital and Acquired Deformities. By Dr. L. A. SAINT-GERMAIN, etc.

THE French books on orthopædics, published only about fifty years ago, are distinguished by a profusion of pictures representing complicated apparatus for the treatment of deformities of the spine—beds, chairs, swings, ladders, see-saws, ropes to climb, and a hundred other things of this kind. The French book before us is remarkable for an almost total absence of such cuts, while, on the other hand, it contains most elaborate engravings to illustrate ablation of the tongue, the anatomy of the eye, the operation for strabismus, the condition of and operation for imperforate anus and hypospadias, as well as figures of the tracheotomy tube and simple artificial limbs. To whatever this may indicate of the scope of the book may be added, that it treats also of such heterogeneous subjects as malformations of the nose, ears, and teeth, congenital hypertrophy of the tongue, fissure of the palate, erectile tumours and nævi, umbilical malformations, hernia, exstrophy of the bladder, infantile paralysis, polydactylism and syndactylism, and *obesity*; in addition to the deformities which are usually thought of when orthopædics are mentioned.

To include all these it was necessary that the author should formulate a new definition of orthopædics. And he did so, claiming that the study of orthopædics embraces all deformities, congenital or acquired; in other words, that it is a sort of cosmetic art.

This wide range of study has introduced the most serious defect of the book before us. It is too large; and there could be well spared from its pages many which do not add a value proportionate to their number. This objection being made, however, there is little to find fault with. The author's views are in the main a faithful reflex of the prevailing opinions in regard to the pathological conditions and treatment of deformities. It is not only clear that he is familiar with the best that has been written in England, as well as in France, upon this subject, but everywhere are to be found the evidences of experience to justify or to correct the affirmation of others. The author conveys his own opinion in a pleasant, often amusing, and sometimes humorous, style. He dwells mournfully upon the "decadence of the nose," and, while stating that it cannot be accounted for because of a decadence in suckling, states, also, that he does not think it attributable to the decrease in the habit of snuff-taking. In speaking of harelip, he cites Bouisson as glorifying Providence for the rarity of the most dangerous form of this malformation, and takes that occasion to warn his students against the tendency to bring in "final causes." When he denies the truth of what are called maternal impressions, he tells a story of a pregnant woman who came to him saying she knew she would give birth to a squirrel, because one had lately leaped on her shoulders and frightened her. Instead of taking the path most men would have struck into under such circumstances, he first assured the prospective mother how easy a confinement she would have in case it turned out as she anticipated. In another place he calls his students'

attention to a peculiar, but not an unknown, paradox in surgery in these words: "You have all seen . . . those enormous tumours, which, when measured daily, diminished two millimeters each day, and which at the end of the year had increased one-half." The entertainment afforded by such *jeux d'esprit* receives an addition of surprise when, in a scientific work of this character, and written by a Frenchman, one finds an allusion to *Dickens's* "fat boy," or to the city of Cincinnati as "Porcopolis," or a deprecation of an English surgeon's commentary on Sayre's method of treating scoliosis—that it was "hanging a man and then taking a cast of him." What could be more striking, more unlikely to be forgotten, than an opinion expressed as follows? "A scoliotic child is placed in the middle of a well-filled amphitheatre, when a few competent men, *rari nantes*, are found in the midst of a crowd of assistants, entire strangers to the subject. The child is shown on all sides, and presents a superb lateral deviation. He is placed before a gauge, and his height is found to measure, I will suppose, 1.42 metres. At once the chin-band and halter are applied. The child is swung to the breezes, and, thanks to previous repetitions, bears the ascent very well. Immediately the assistants precipitate themselves upon him and swathe him in a plaster jacket, . . . which dries with astonishing rapidity. The apparatus once dry, the child is laid on the ground; he is brought back to the gauge; he measures 1.45 metres. Result: 3 centimetres gained. General enthusiasm. Apotheosis." And how complete the idea when, after describing the loosening of the fit of the jacket in a few days, and the determination of this fact, *in a word*, the author adds: "The amphitheatre is not there. You cannot get the enthusiasts of the day before together again, to show them the annulment of the marvellous result. Their position is settled. They have witnessed a miracle, and go everywhere propagating error." Again, in reference to early operations for harelip, done by accoucheurs, we read: "If we were still in the times when the different provinces of the medical art foraged upon their reciprocal frontiers, and undertook, *à propos* of these limits, veritable wars, one could not fail to say that the accoucheurs made haste to operate upon the little patients while they had control of them, or that, justly impressed with the sad tribute which the first years of early infancy pay to mortality, they were unwilling that harelips should disappear without having enriched science with their observation."

So much for our author's style, which is further enlivened by admirable historical and other references to both ancient and modern authors. The matter of his work is excellent. It might be objected that he finds too much to complain about in others, and it could hardly be claimed that his preface is a model of modesty. Nevertheless, his book is a valuable and an interesting one. If it were less so, it would never be read. As it is, we think it ought to be, and will be.

C. W. D.

Art. XXI.—*A text-book of Pathological Anatomy and Pathogenesis.* By ERNST ZIEGLER, Prof. of Pathological Anatomy in the University of Tübingen. Translated and edited for English students by DONALD MAC ALISTER, M.A., M.B., Member of the Royal College of Physicians, Fellow and Medical Lecturer of St. John's College, Cambridge. Part I. General Pathological Anatomy, pp. 360, figs. 117. London, Macmillan & Co. 1883.

FROM the able translator's preface we learn that this excellent work of Prof. Ziegler's grew out of attempt to revise Förster's well-known manual of pathological anatomy, which it was gradually found would be almost equivalent to writing a new treatise, and the latter alternative was therefore finally adopted. Prof. Ziegler explains that a great part of his text is based upon observations made or verified by himself, and when he has drawn from other sources the needful authorities have been carefully cited. The present English version was begun on the basis of the first German edition, but a second edition was so quickly called for in Germany, that time was secured to embody in this, valuable additions made by the author, together with many improvements agreed upon by Dr. Ziegler and his English translator. The latter states that he has besides added full notices of many French and English memoirs which throw light upon subjects treated of in the text.

The style of this book is far superior to the rugged and idiomatic one, which is too often inflicted upon students in translations from the German. In fact it leaves little to be desired in the way of elegance, correctness, and perspicuity. Its method of arrangement is admirable, its descriptions often models of clearness and brevity, and its illustrations, which really do illustrate, are numerous, superbly executed, and in most instances so minutely accurate, that they might be mistaken for copies of photo-micrographs from the diseased tissues themselves.

The first section of the book is devoted to malformations, treating of deformities in single individuals, and of double monstrosities. In Section II. are considered anomalies in the distribution of the blood and the lymph. Sections III. and IV. are devoted respectively to the retrogressive and progressive disturbances of nutrition, whilst Section V. discusses inflammation and inflammatory growths, under which in a subdivision of "The infective granulomata" are grouped tubercle, syphilis, leprosy, lupus, glanders, and actinomycosis. The important subject of tumours fills the fifty-nine pages of Section VI.; and Section VII. on parasites, though last, is the newest and most important of all, at least from the stand-point of the great medical science of the future—preventive medicine.

The dwindling minority of progressive physicians who still shut their eyes to microscopic evidence, and "don't believe in bacteria," will find little aid and comfort in Chap. XXX., which devotes over forty pages to the schizomycetes or bacteria, their morphology, development, and pathological effects upon the human organism. This full recognition in a systematic work of the momentous fact that general diseases are produced by organic entities, which scarcely a decade since was practically ignored by such representative German pathologists as Rokitansky and Rindfleisch, and more recently was but briefly touched upon by Wagner and Orth, marks an important epoch in the history of the germ theory of disease, and opens the way for a far more general conception of the zymotic affections

as being the expressions of a constant "struggle for existence" between our own cell elements and low forms of vegetable life (as real and tangible enemies to human existence as is the trichina or the rattlesnake), the growth and development of which within the human system produce the dangerous and often fatal symptoms of the maladies in question.

Our author follows Colin in his well-known classification into sphærobacteria, microbacteria, desmobacteria, and spirobacteria, and quotes the corroborative statement of Koch, whose long-continued experiments show "that each species of bacteria possesses characteristic and easily recognizable peculiarities in respect of structure, form, size, and mode of growth of its colonies upon the gelatin" whereon the experiments were conducted.

In connection with the interesting subject of the *conditions of life* for bacteria, obviously so important to the practical physician, because his best remedies in the zymotic diseases must be those which will most satisfactorily check growth and development in the schizomycetes, we find it stated that a certain amount of oxygen is necessary to the reproduction of many forms, but that pure oxygen gas is said to kill them outright. Some curious and valuable information is given in regard to the temperatures above and below which growth of the bacteria ceases; thus it is stated that development of all kinds terminates at a temperature of 5° C., the bacteria becoming stiff and immobile, although they are not absolutely killed even by very extreme degrees of cold. The knowledge of this latter fact seems to explain the remarkable renewal of yellow fever upon the U. S. S. Plymouth a few years since, and would have promptly ended the plausible but worthless scheme for destroying yellow fever germs by cold, involving an expenditure of several hundred thousand dollars, which was almost successfully urged through Congress during our last great epidemic. Under the head of influence of non-nutritive or foreign substances in the nutrient liquid, are considered the action of different bacteria upon each other, and also the effect of various mineral and other substances, constituting the invaluable group of disinfectants. Among these chief weapons in the sanitary armamentarium, corrosive sublimate is given on the authority of Koch, Wolfhügel, and others the first place.

The bacteria are divided by our author from a pathological stand-point into, 1st, those which are passing all the time through the human body, without being able to find in it conditions favourable for their development; 2d, those which find their appropriate soil in the perfectly healthy organism, in which they grow and multiply; and 3d, "those which are unable to settle in a perfectly healthy body, but can only develop when the physico-chemical condition of the tissues is morbidly altered so as to correspond with their requirements." The two latter of these varieties are grouped together under the title of the *Pathogenous bacteria*, and comprise, of course, the chief representatives of interest to the physician and pathologist.

It would occupy too much space for us to enter upon a detailed review of all this important chapter, and we will therefore merely remark, *en passant*, that Fig. 76, showing a section containing colonies of micrococci from the vocal cord of a child; Fig. 77, exhibiting micrococcus septicus in hepatic capillaries, with necrosis of the liver cells; Fig. 78, bacillus anthracis, liver cells unaffected; Fig. 79, displaying under a low power the first stage of hepatic abscess depending on obstruction of a venule by pyæmic micrococcus, and Fig. 80, picturing Koch's bacillus tuberculosis, all admirably represent these important downright facts in pathological histology, and are therefore worthy of most attentive study.

Chapter XXXI. upon the hyphomyeetes and blastomyeetes (moulds and yeasts) as pathological agents, and Chap. XXXII. upon the animal parasites, are both elaborate yet concise, and continue the same display of a master's hand, in the work of description and explanation, which characterizes the earlier portions of the volume.

Perhaps it is hardly just either to the author and translator or to our own readers, to judge this book by the portion which is now before us, but if the promise here given is fulfilled in Part Second, devoted to special pathological anatomy, we feel sure that a systematic text-book will be supplied, so fully abreast of the advances recently made in this most progressive of the medical sciences as to render it extremely valuable to practitioners and students alike—one which must accomplish much towards securing for pathological anatomy its rightful place, as the chief corner-stone of all true medical science.

J. G. R.

ART. XXII.—*The Transactions of The Medico-Chirurgical Society of Edinburgh.* Vol. I. Session 1881–82. Svo. pp. 188. Oliver and Boyd, Publishers to the Society, Edinburgh, 1882.

ALTHOUGH founded in 1821, this is the first year in which the transactions of the society have been published in book form. By the catalogue of members given, we find that there are 151 resident, and 85 non-resident members. Dr. George W. Balfour is the President of the Society, having been elected for two years, in January, 1882. The society holds nine meetings in the year, and the sessions are of general interest, as a great variety of subjects are presented; patients are introduced, and morbid specimens, miscellaneous objects, surgical appliances, casts, drawings, photographs, etc., are exhibited. Eighteen original papers were read and discussed; ten patients exhibited; twenty pathological specimens shown; six foreign bodies, also; besides surgical appliances, photographs, etc. Original communications were presented upon the following varied subjects.

1. Anatomy of the pia mater, by Dr. J. Beatty Tuke, M.D.
2. Hereditary transmission of disease, by George Leslie, M.D.
3. Action of the auricles in health and disease, by George A. Gibson, M.D.
4. Arguments in favour of the theory of dilatation of the heart as the cause of cardiac hæmic murmurs, and of the appendix of the left auricle being the primary seat of this murmur, by George W. Balfour, M.D.
5. The murmurs of debility in the pulmonary and tricuspid areas, by William Russell, M.D.
6. Notes on the position and mechanism of the hæmic murmur, by George W. Balfour, M.D.
7. A case of diabetic coma with Lipæmia, by Prof. Thomas R. Fraser, M.D.
8. Some of the sequelæ of acute infectious diseases in children, by James Carmichael, M.D.
9. Alternation, Periodicity, and Relapse in mental diseases, by Thomas S. Clouston, M.D.
10. The causes of tinnitus aurium, by P. McBride, M.D.

11. The treatment of syphilis, by Francis Cadell, M.D.
12. On the treatment of fresh wounds, by John Duncan, M.D.
13. On accidental experiment with antiseptics, by the same.
14. Cranial injuries, by Prof. John Chiene.
15. Case of intestinal obstruction, treated by opening the abdomen, by Mr. Joseph Bell.
16. Notes on rupture of the urethra, and its treatment, by Mr. Joseph Bell.
17. Cases of stricture of the urethra, by Francis Cadell, M.D.
18. On a rare form of senile gangrene, by Mr. Joseph Bell.

Many of these papers are very creditable to their authors, and are made of additional value to the reader by the able discussions which are reported as appendices to them. We cordially recommend the volume as one containing much that is interesting and instructive. R. P. H.

ART. XXIII.—*A History of Tuberculosis from the Time of Sylvius to the Present Day, being in part a translation, with Notes and Additions, from the German of Dr. Arnold Spina; containing also an Account of the Researches and Discoveries of Dr. Robert Koch and other Recent Investigators.* By ERIC E. SATTLER, M.D. 12mo. pp. 191. Cincinnati: Robert Clarke & Co., 1883.

It is a great convenience to English readers to be able to read Spina's *Studies on Tuberculosis* in our own language; and for this opportunity, as far as it is presented, we are indebted to Dr. Sattler. At the same time it diminishes this satisfaction to find that only five sections of Spina's work are thus translated, and that this is followed by two chapters in which it is sought to bring the history of tuberculosis down to the present time, including a full description of the latest experiments of Dr. Spina himself. Spina's own researches included 55 pages out of 122 pages of the original work, but 67 being devoted to the history; while in Dr. Sattler's book, out of 184 pages, 124 are occupied with the translation of Spina's history of tuberculosis, and but 60 are devoted to recent researches, including a full account of those of Koch and others, as well as those of Spina. The apparently necessary conclusion is that it is neither one thing nor the other, neither a translation of Spina nor a history of tuberculosis by Sattler. We think, however, that a sufficient proportion of the book is purely Spina's work to demand that his name, and not Sattler's, should appear on the back of the volume. Had the book been one of 300 or 400 pages, which might easily be written upon the subject, an introduction, consisting of a translation of Spina's history, might have formed a part of it with no other acknowledgment than that in the title-page and preface.

As to the matter written by Dr. Sattler himself, the account of Koch's experiments, as well as that of other investigations since Koch's first paper, will be found very interesting reading, and the methods employed by the various investigators, as detailed by Dr. Sattler, most convenient for reference. If the literature of the subject grows as rapidly in the second as it did in the first year after Koch's announcement, a new edition of the book will soon be required, when we hope to see the names of Spina and Sattler on the back.

J. T.

ART. XXIV.—*Disease Germs.*

1. *The Bacteria.* By Dr. ANTOINE MAGNIN, Licentiate of Natural Sciences, Chief of the Practical Labours in Natural History to the Faculty of Medicine of Lyons, etc. Translated by George M. Sternberg, M.D., Surgeon U. S. Army. 8vo. pp. 227. Boston: Little, Brown & Co. 1880.
2. *Bacteria: the Smallest Living Organisms.* By Dr. FERDINAND COHN. Translated by Dr. CHARLES S. DOLLEY. Pamphlet, pp. 30. Rochester, N. Y.
3. *Bacteria and the Germ Theory of Disease; Eight Lectures delivered at the Chicago Medical College.* By Dr. H. GRADLE, Prof. of Physiology, Chicago Medical College. 8vo. pp. 219. Chicago: W. T. Keener, 1883.
4. *On the Relations of Micro-Organisms to Disease. The Cartwright Lectures delivered before the Alumni Association of the College of Physicians and Surgeons, New York.* By WILLIAM T. BELFIELD, M.D., Lecturer on Pathology and on Genito-Urinary Diseases, Rush Medical College, Chicago. 16mo. pp. 131. Chicago: W. T. Keener, 1883.

THE literature of micro-organisms and of their relations to disease has increased to such an extent that some effort at systematic arrangement of our knowledge is not only justified, but necessary to any one who desires to familiarize himself with it. One of the most valuable of these is the work of Magnin, translated by Dr. Sternberg, containing all that is essential as to history and morphology, while the rôle of the bacteria in contagious and virulent diseases is well described to the date of publication. Very useful, too, will be found the pamphlet of Cohn, whose name is better known in connection with bacteria than that of any other naturalist, translated by Dr. Dolley, while a student of medicine in the University of Pennsylvania. The smaller books of Dr. Belfield and Gradle are upon the same subject, which is extended to include the important more recent application to tuberculosis. The two books supplement each other in certain respects; so that the reader who desires to be well informed may read both with advantage. Dr. Gradle's work is almost purely historical, while Dr. Belfield has evidently a leaning towards the infectious nature and parasitic origin of tuberculosis, and he seeks to strengthen his position whenever he can, and of course to weaken the other side. We cannot but think he has ignored a few points on that side which should have been brought forward. The lectures are, however, a valuable introduction to the subject, and should be read by all interested in it, as should also those of Dr. Gradle.

It is out of the question, and indeed would scarcely be profitable under the circumstances, to attempt to give the scope of the subject. But to those who have not kept themselves *au courant* with the literature covering the relation of micro-organisms to disease, it may be interesting to know that the number of diseases in which bacteria are found, either in the secretions, the blood, or the tissues, is so far increased as to include suppurating wounds, abscesses, furuncle, osteomyelitis, pyæmia, traumatic fever, erysipelas, gangrene, phlegmon, malignant œdema, charbon, tuberculosis, glanders, typhoid fever, relapsing fever, smallpox, cowpox, sheep-pox, measles, malaria, diphtheria, leprosy, syphilis, milk fever, gonorrhœa, and gonorrhœal conjunctivitis, trachoma, croupous pneumonia, endocarditis, sympathetic ophthalmia, whooping-cough, rhinoscleroma, pterygium, rhus-poisoning, and other less known conditions.

ART. XXV.—*De l'Excision du Goître Parenchymateux.* Par Le docteur PAUL LIEBRECHT, Assistant à l'Université de Liège, Ext. du Bulletin de l'Académie Royale de Médecine de Belgique; 3e Sér., t. xviii., No. 3. 8vo. pp. 270. Bruxelles: H. Manceaux, 1883.

The Excision of Parenchymatous Goitre. By Dr. PAUL LIEBRECHT, etc.

No one who has not undertaken a work like this can appreciate correctly the immense amount of labour it represents, or approach the criticism of it with the degree of sympathy it demands. About 350 cases of operation for removal of the diseased thyroid gland have been collected, analyzed, and compared; the details of many have been reproduced; the history of the operation has been studied; its theoretical and practical merits have been carefully weighed, and certain conclusions—the outcome of all this research—are stated for the benefit of those who have not the time or opportunity to go over all the ground for themselves. These conclusions are only in part drawn from what the author has reproduced. They have been forced upon his mind by countless details, only a certain proportion of which could possibly be included in his book. For this reason, and more assuredly because no large number of readers are likely to have the patience to go through even what he has recorded, it is hardly to be expected that his views will soon be fully accepted. Nevertheless, they will undoubtedly secure respectful attention, and his unwearied devotion to his subject will not go unrewarded.

His preliminary remarks indicate the thoroughness of his research, and show that he appreciates one of its greatest merits—that of furnishing a repertorium, where other authors may find the facts necessary to the formation of an individual judgment. With this in view, he has noted, as far as possible, in each report: the sex and age of the patient; the date of operation; the description of the goitre; the accidents to which it gave rise and the indication for operation; the details of the operation; the results of the operation; the final issue; other unclassified points; the name of the operator, and the source from which his account is drawn.

The reports are classified according to the nationality of each operator: the German, Austrian, and Swiss being put together and amounting to 226; the French amounting to 34; the English to 30; the American to 16; the Italian to 10; the Prussian to 3; the Swedish to 1; and the Belgian to 2—a total of 322 operations. Of these 250 were cured, 64 died, 2 were not completed, and in 5 the result is uncertain. He adds, without details, 29 cases of Billroth's and 5 of Chelius's—29 cured and 5 ending fatally, which gives in all a total of 356 with a mortality of 69, or 19.39 per cent.

A special section is devoted to the history of the literature of goitre, going back to Hippocrates, and correcting certain errors in regard to the views and statements of some of the ancients, quoting their *ipsissima verba*. The first author to whom Dr. Liebrecht credits a report, in precise terms, of an extirpation of a goitre is Fabricius Hildanus, whose account he quotes almost in full. This operation was done upon a child by a quack after Hildanus had refused to undertake it. The child, a girl, died under the knife of the operator. In the eighteenth century the operation was performed a few times, though as late as 1794 Wichmann characterizes it as “in good German literally cutting the throat of one's patient.” Even Bardeleben, as late as 1875, repudiated the operation,

while Erichsen, 1878, says the operation "is seldom to be thought of." The first surgeon in France who warmly advocated it was Michel, in 1873. In other countries it was until recently held in equally low esteem. But, at present, owing to the wonderful success of Billroth, Lücke, Bruns, Kocher, and others, it is growing into more general adoption, and in France the author speaks of it as acquiring popularity. "It is especially," he says, "since the second half of this century, and more particularly since a dozen years, that thyroidectomy has conquered an established position among legitimate surgical operations. Actually the number of known total extirpations exceeds 400, of which the great majority have been crowned with success." This change he compares with the history of ovariectomy, and claims that, equally with the latter operation, the excision of a goitre is demanded whenever not specially contraindicated.

Following this the author devotes a section to the descriptive and topographical anatomy of the thyroid gland and of goitre. Next he takes up its pathological anatomy and its influence on neighbouring organs. Next come the indications and contraindications for the operation, naturally attributing great weight to Billroth's opinions. His own conclusions he formulates as follows:—

"One *should* operate: when other means have failed and if the accidents have acquired gravity, or when one can foresee that they will acquire it at a given period. The last result can be anticipated when there is a continual increase of the goitre. One *may* operate: to get rid of a deformity, either for æsthetic reasons or when it constitutes for the patient an obstacle to his occupation or his social relations; or, in fine, when the tumour, without determining accidents, properly so called, is the cause of annoyance or inconvenience to the patient."

He makes a point of the danger of delaying the operation, and cites the valuable paper of Kocher on the Indications for the Extirpation of Goitre in the Present Position of Antisepsis, published in the *Correspondenzblatt f. Schweizer Aerzte*, 1878, No. 23, to bear him out in his opinions. He admits only one absolute contraindication—atheromatous degeneration of the arteries.

As to total or partial excision, the statistics are slightly in favour of the former; and he would limit partial excision to goitres clearly pediculated or circumscribed and isolable from the surrounding tissues. Above all, one must not leave behind any diseased tissue, for fear of recurrence.

The method of operating described includes mixed anæsthesia and antiseptic dressings—the spray Liebrecht considers superfluous. Every detail of the operation is described most carefully, and with the greatest particularity, and the method of Baumgärtner (*Centralblatt f. Chirurgie*, 1881, No. 3), for the control of hemorrhage, strongly recommended. This method consists in dissecting the tumour out, seizing each bloodvessel or fibrous band as encountered with two "*pincers hémostatiques*," and dividing between these, leaving both in place. When the tumour is removed the hemostatic forceps are taken off one by one. Many will be found to contain no bloodvessels, or such small ones that they do not bleed after the pressure they have had. When a vessel does bleed it is to be carefully isolated, and ligated. For ligatures the author prefers good catgut, hardened in chromic acid—as Lister recommends—and advises cutting the ends off and closing the knot up in the wound.

Preliminary tracheotomy does not appear to be approved by facts, and it certainly is not recommended, unless in exceptional cases, by the most distinguished and successful operators.

The author advises the use of Lister's antiseptic dressings after the operation.

The consideration of the sequelæ of thyroideectomy leads to some most interesting statements in regard to the wounding of nerves. The nerves which may be injured are the pneumogastric, the inferior laryngeal, and the great sympathetic. The first accident has never been observed in this operation. But, even if it should, Liebrecht thinks it would not necessarily entail unfortunate consequences. He cites a number of cases where portions of the pneumogastric have been removed, in other operations, without any ill effect whatever. Injury of the recurrent laryngeal nerves by ligature or by section has occurred a number of times, followed by impairment of phonation and deglutition, and even by bronchial inflammation and tetanus. Whether the two latter sequelæ were consequences or not does not appear clear, but it is doubtful that they were. The voice alterations have usually passed off in a few weeks. The difficulty in swallowing occurred in a bad case of Billroth's, and amounted to an impossibility, the patient dying collapsed in forty-eight hours. Here, again, it is doubtful that the ligation of the recurrent nerve with the inferior thyroid artery was the cause of the trouble: first, because of the nature of the case, and second, because, if it were, similar effects ought to have been observed in some of the other cases where a similar accident happened.

As to the remote effects of excision of the thyroid, the author cites an interesting communication of Koehler to the Berlin Congress, in which he claims that there are few cases of operation in which general disturbances do not follow. These troubles become more pronounced as time goes on. They consist in dulness, lassitude, and progressive pernicious anæmia—what Koehler calls the "goitrous cachexia." This assertion of Koehler's was denied by Bardeleben and Wölfler—the latter of whom speaks, in a sense, for Billroth. Liebrecht does not commit himself as to the facts, but calls attention to their influence upon the whole question of total extirpation.

In conclusion, the author analyzes his statistics to show the results of the operation and the causes that have militated against its success. This leads him to the statement that only about $8\frac{3}{4}$ per cent. of the deaths are fairly attributable to inevitable causes, and that the excision of parenchymatous goitre has taken its place in surgical practice, and will shortly be done under conditions similar to those affecting the removal of every other kind of tumours.

The last pages of the book contain a full and useful bibliography of the subject, and a table of contents.

From this brief epitome it may be seen how valuable a contribution to surgical literature we have here. Instead of the arbitrary opinion of a single operator, we have a collection of facts, to the proper estimation of which the compiler's analysis and conclusion offer most useful assistance. As far as we can judge, these conclusions are fully justified by the facts cited, and it makes little matter that they are opposed to the opinion of some surgeons whom the whole world holds in deserved respect. The mountain will not come to Mahomet—Mahomet must come to the mountain.

C. W. D.

ART. XXVI.—*Health Reports.*

1. *First Annual Report of the Board of Health of the State of New Hampshire for the year ending April 30, 1882.* Concord, 1882, pp. 318.
2. *Fifth Annual Report of the Board of Health of the State of Rhode Island for 1882.* Providence, 1883. Pamphlet, pp. 327.
3. *First Report of the State Board of Health of Arkansas from April, 1881, to Dec. 1882.* Little Rock, 1883. Pamphlet, pp. 181.

1. THE *New Hampshire* Report, being the first after the establishment of the Board of Health, deals chiefly with the mode of organization and of preliminary work, although here, as elsewhere in so many parts of the United States, has been found an unwelcome opportunity for practical effort in battling against the spread of smallpox. A suitable bulk is given to the volume by essays furnished by various members of the board and others, which, without contributing any important additions to the science of hygiene, are valuable to the inhabitants of the State, not only as applying general sanitary rules to special local conditions, but also as aiding in the dissemination of knowledge respecting those great principles which regulate systematic care of the health.

From the secretary's report we find that the board is composed of three physicians, one civil engineer, the governor, and the attorney-general, these last two being *ex officio* members. As usual, the secretary is paid a salary, but the other gentlemen receive no compensation, although their actual expenses whilst on duty are allowed. The total sum appropriated to the board is limited to \$3000 annually.

Efforts to obstruct the development of local or general smallpox epidemics, especially by the liberal employment of vaccination, appear to have met with highly gratifying success, several instances being recorded in which the outbreak was restricted to the single individual first attacked. In one case, imported from New York, the young man was supposed to be suffering from chicken-pox, and isolation, etc. being therefore neglected, he contrived to infect, directly and indirectly, thirty-eight persons, giving rise to thirteen cases of smallpox, of whom eight died, and twenty-five cases of varioloid, all of which recovered. The secretary also urges, ably and forcibly, the importance of providing against typhoid fever from contaminated water-supply, and suggests some valuable cautions in regard to diphtheria, the sanitation of seaside resorts, the use of impure ice, and other kindred topics.

After an essay on Vaccination, by Professor C. A. Lindsley, M.D., of Yale College, which is borrowed from the Report of the Connecticut State Board of Health for last year, appears a useful article upon Ventilation, by Dr. G. P. Conn, of Concord, President of the Board, in which is justly argued the superior importance of plentifully supplying fresh air to dwellings in the colder latitudes. Several of the wood-cuts with which this paper is illustrated appear to have been loaned (doubtless not unwillingly) by the manufacturer of a ventilating grate, which is highly praised. Next follows a paper upon *Suburban School-Houses*, by Warren R. Briggs, architect, of Bridgeport, Conn., which is illustrated by eleven plans, pointing out some of the best methods of avoiding those defects of sanitary construction which are unfortunately too common in such edifices, and tend, even in the schoolmaster's paradise of New England, sadly to counterbal-

ance the benefits of popular education, by sowing the seeds of physical weakness and degeneracy among the youth of America.

Water Pollution, Public and Private, is the title of an excellent paper from the scholarly pen of Dr. A. H. Crosby, of Concord, and although a little imperfect, it is complete enough to save a vast amount of human suffering and death if its practical suggestions were heeded by those to whom it is addressed.

The Registration report, showing the number of births, marriages, and deaths in the different counties, and an appendix containing the more important laws of the State bearing upon sanitation, conclude the volume, which, as the first attempt of a newly-organized board of health, is highly creditable, and gives promise of a good degree of future usefulness.

2. The diligent secretary of the *Rhode Island* State Board of Health appears to have taken a lion's share of the work in preparing the report, more than three-fourths of the volume being made up of his contributions.

From this document it appears that no great emergency requiring special meetings of the board has arisen during the year, and the only important communications received by it were, one in regard to smallpox at Newport, and another respecting the unsanitary condition of the State House at Providence. Much regret was felt over the failure of Congress to supply means to the National Board of Health to pursue its great investigation into the nature of the malarial poison, which the State Board had already prepared the way for, and proposed to aid, as an inquiry likely to benefit very largely the inhabitants of the United States. On account of the parsimonious allowance to the board (only three hundred dollars annually is appropriated by the Rhode Island Legislature), no original investigations could be undertaken, but sundry popular articles upon sanitary subjects were published by the secretary as aids towards forming correct public opinion upon these important matters.

According to the registration report, there were, during the year 1881, in a population of 276,531, 6761 births (more than ever before recorded), 2750 marriages, and 5016 deaths; the death-rate of the last five years is given at the low figure of 17.2 per 1000. From the summary of the death register we find that more than one-quarter of all the deaths which occur in Rhode Island are caused by diseases of the lungs and respiratory passages. Consumption is the most fatal malady, and pneumonia stands next, being followed by cardiac disorders and old age, to which 247 deaths are attributed. Scarletina, which stood second on the list in 1880, had, in 1881, dropped to the twelfth place.

A praiseworthy effort to obtain statistics in regard to the prevalence and severity of the more common acute diseases, has not, we regret to observe, met with all the success it merited, only about thirty towns furnishing the desired accounts. Full annual reports from the numerous medical correspondents of the board in various parts of the State are given, but in the absence of any complete tabulated statement of the results afford information of local value only.

The paper by Edwin E. Calder, on the *Composition and Properties of milk*, is an exhaustive compilation of the main facts in regard to this important article of food, but it is chiefly valuable to an experienced sanitarian as narrating the author's own experience as milk analyst of the city of Providence. After a five years' term of service, in which the lactometer was applied to the testing of thousands of samples, he declares that, taken in connection with the taste, smell, colour, and general appearance of the

fluid, this instrument cannot fail to be of great service in examining the milk from any dairy, or the supply of any large city, also that in no instance have its readings caused any injustice to the milk-dealer. A supplementary chemical analysis is often necessary to determine the percentage composition in essential constituents and for the detection of foreign substances. This analysis, however, rarely requires to be complete, the determination of the total solids, fats, solids not fat, and the amount and nature of the ash, being generally sufficient. One shrewd provision of the State law, which we would like to see enforced in our own city against these Herods of the nineteenth century, is that any milkman convicted of selling impure milk shall have his name and place of business "published in two newspapers printed in the town, or county, where the offence has been committed."

The other essay, on *Parks and Open Spaces in Cities*, by T. C. Clark, M.D., of Providence, is a brief, but earnest plea in favour of these popular breathing-places, which do so much to reduce the sick and death-rate among the children of the poor.

3. The *Arkansas State Board of Health Report* covers a period of nearly two years from its establishment in April, 1881, to December, 1882, and records the struggles of a beneficent organization to be of use to a people who seem to be scarcely educated up to the degree of appreciating the infinite hygienic advantages which it would secure if properly sustained by the community. Some idea may be gained of the difficulties which are encountered by sanitary authorities among ignorant and prejudiced persons from the statement that the Local Board of Health of Little Rock—

"During the early part of the year 1881, was doing good work in cleansing the city. But the visits of the Sanitary Inspectors to the premises of the Mayor and several of the Aldermen were regarded as infringements of their personal rights; and the indignation of the town Council was manifested in the repeal of the health ordinances sanctioning such invasions, and in abolishing the Board of Health. As a consequence, filth everywhere accumulated in disease-spreading abundance. Ordinary diseases assumed aggravated forms, and did not respond to treatment; sickness was general, and the mortality was nearly, if not quite, double that of any period of like duration in the city's history."

As is apt to be the case in new civilizations, the most effectual work of the State Board of Health was accomplished in the presence of contagious diseases, particularly of smallpox, when the popular dread of a threatened epidemic swayed public opinion strongly in favour of the sanitary officials. Several examples of the beneficial effects of prompt isolation and vaccination in preventing the spreading of variola are reported, as, for instance, the cases at Little Rock, seventeen of which were recorded, four in vaccinated patients with one death, and thirteen among unvaccinated persons with nine deaths, a mortality of over two-thirds. In one of these series of instances, the infection was believed to have been introduced by some discarded underclothing, picked up and washed by the first person attacked, who was a servant in the hotel where it broke out. On another occasion, smallpox broke out among the passengers in a box-car upon the Memphis and Little Rock Railroad. As neither of the towns between which it was discovered would consent to receive the cases, the main track was cut, the box-car containing the five cases side-tracked, and a physician, medicines, and supplies being furnished by the railroad company, the patients were cared for in this unusual way, along with two cases which afterwards

appeared in one of the neighbouring towns, without further extension of the malady.

With every disposition to make liberal allowances for imperfections in the work of a newly formed Board of Health, the operations of which have been carried on in spite of such discouraging obstacles as those already alluded to, we must deprecate the careless proof-reading in future Reports which would represent the presiding officer as promulgating such astounding declarations as the following, on p. 49, "Hygiene or public health is that condition of body, supported by physical causes, such as air, water, and food." Nearly half of the volume is taken up with a reprint of Dr. Gihon's very able and important report on the prevention of venereal diseases made to the American Public Health Association, at its New Orleans meeting; with the Meteorological Report prepared by W. U. Simons, of the U. S., a signal corps stationed at Little Rock; and with the mortuary report of Little Rock, showing a death-rate of nearly 40 per 1000 in a population of a little over thirteen thousand as given by the U. S. census of 1880; although in fairness we should mention that local authorities consider this figure too low, and place the number of inhabitants at about 18,000, which would reduce the rate of death to 29 per thousand annually.

J. G. R.

ART. XXVII.—*Excision of the Knee-Joint, with Report of Twenty-Eight Cases.* Illustrated by thirteen Photo-Lithographs and Wood Engravings. By GEORGE EDGEWORTH FENWICK, M.D., C.M., etc. Svo. pp. 68. Montreal: Dawson Bros., 1883.

IN his preface the author states that, at the request of friends, he has "thrown together a few observations on the subject of excision of the knee-joint, principally with the object of placing on record the statistics of the Montreal General Hospital in reference to that operation." He further states that he has brought prominently forward a method of section of the bones, to which he attributes much of his success. This method was given to the profession in the pages of the *Canada Medical Journal* some sixteen years ago; but it has not attracted the attention which it merits. Justified by his own success, he again urges its adoption. It has the peculiarity of including a removal of the opposite bone surfaces in a curvilinear manner; so that, when the shafts are brought into apposition, the newly made convexity of one—the femur—shall fit into a corresponding concavity of the other—the tibia.

This practical suggestion, which the author deems the most important of those he makes, is accompanied, however, by others, occurring incidentally, which add materially to the value of his *brochure*. Among these may be set down the emphasizing of the need for personal supervision of the after-treatment by the surgeon himself. As the author remarks, "A little trouble and attention in this respect will amply repay the surgeon." This truth is not limited to operations on the knee-joint.

The book opens with an argument, which is scarcely needed nowadays, in favour of the operation of excision *per se*. But the author does not lay down clearly the cases to which he believes the operation to be specially applicable, though he undertakes to do so; and one is compelled to

gather from the cases he reports that any chronic condition which interferes with the use of the joint, as a joint, even though it cause but little pain, justifies it in his opinion. It would almost seem as if his zeal for the operation, had led him at times to operate when others would have hesitated; yet the results obtained appear to have been satisfactory to him and to his patients, and they would certainly be better judges than one at a distance.

In the course of his remarks, the author takes occasion to express his disbelief in the theory which would attribute joint disease to extravasation of blood into the cancellated tissue beneath the cartilage, relegating the cause rather vaguely to sudden strains, twists, blows, wounds, and cold, causing inflammation of the synovial membrane and subsequent destruction of cartilage and involvement of bone.

But, when we come to what the author sets before him as his real object, namely, describing a method of operating, we find him clear and full enough in his statements. The method he advocates may be epitomized as follows: An incision is made from the back of one condyle to the back of the other, going below the patella, and dividing its ligament and the lateral ligaments, after which the crucial ligaments are divided. Next the articular surface of the femur is removed in such a manner as to leave a semi-cylindrical end convex from before backward, and the articular end of the tibia so as to present a corresponding semi-cylindrical concavity. This the author does with a fine fret-work saw fitted to a Butcher's frame. The condyles must be reduced to an equal extent, so as to preserve their proper relations. The two ends must then be accurately adjusted. The epiphyseal line is not to be disturbed, if it can possibly be avoided. The hamstring tendons are to be let alone, unless they prevent putting the bone in proper position. The patella is to be removed with its fibrous investment. Hemorrhage is next to be checked, and suitable dressings applied. The apparatus recommended is that of Dr. Patrick Heron Watson, of Edinburgh, consisting of a rod of iron extending from the groin to the toes, bent at the ankle to follow the line of the foot, and at the knee so as to arch well above it. Dr. Fenwick has added two tin plates, one to embrace partly the thigh, and one to do the same to the upper part of the leg, so as to prevent twisting. The bar has either one ring or two, by which it can be swung. The lower part of the fixation apparatus consists of a Gooch's splint, made to partly embrace the limb, and leave the knee almost entirely free. The apparatus is applied with a paraffine bandage before the wound is closed, and then this is done after the method of Lister, the dressing being made to include the lower splint, but passing below the arch in the rod above.

A second part of Dr. Fenwick's book contains detailed accounts of ten cases, illustrated by nine photographs. The accounts are interesting, and the pictures are admirable in their execution, giving the impression of most favourable results in the author's operations.

Finally, there is a table of twenty-eight cases—twenty-one by Dr. Fenwick—with only one death. Comparing Dr. Fenwick's operations with those published by other surgeons, they appear to have been more successful, not only as to the mortality, but also as to the results obtained. (In the body of his book (p. 13) Dr. Fenwick says there were two deaths in twenty-eight cases, "only one of which can be ascribed as due to the operation." The table, as just stated, gives but one death. It also classes one result as doubtful, and includes two cases where amputation had to be performed.)

So much for the matter of this book. The style is loose and unmethodical, the punctuation is sometimes very bad, and the language and construction trying to the reader. There are a number of rather serious errors of date, corrected in a slip of errata, and the very title-page contains a misprint by which lithograph becomes "lithographs". These faults are not of great consequence as compared with the instructiveness of the author's matter; but they ought to be corrected if the book comes to a second edition.

C. W. D.

ART. XXVIII.—*Types of Insanity: An Illustrated Guide in the Physical Diagnosis of Mental Disease.* By ALLEN McLANE HAMILTON, M.D., one of the Consulting Physicians to the Insane Hospitals of New York City, etc. New York: Wm. Wood & Co., 1883.

THE photographs from La Salpêtrière, found in the works of Charcot, Bourneville, and Regnaud, and others of the French school, have done so much towards making the fame of these authors, that we have wondered sometimes that the same comparatively easy method of spreading information and acquiring reputation had not been more resorted to in other countries than France. Dr. Hamilton has here utilized the method in some studies of insanity. The plates were drawn from instantaneous photographs, and the work has been admirably done. The subjects were selected from many hundreds of patients, and are typical. The forms of mental disease illustrated by the plates are idioey, imbecility, melancholia attonita, chronic melancholia, subacute mania, chronic mania, dementia, and general paresis.

Certain acute affections of the ear, and the condition of the teeth in the insane, are also shown in the last plate. In Fig. 6 of this plate, referred to as syphilitic teeth, serrated and irregular lower teeth are represented. Hutchinson's view, if we remember aright, was that only the condition of the upper incisors was indicative of syphilis. The whole doctrine of syphilitic teeth is doubtful. Notched, serrated, and irregular teeth of various kinds probably represent mal-nutrition and arrested development from various causes.

Descriptive text accompanies the illustrations, and an abstract of the laws of various States with reference to the commitment of the insane is added.

The work is an interesting contribution to psychiatry. C. K. M.

ART. XXIX.—*On the Treatment of Wounds and Fractures: Clinical Lectures.* By SAMPSON GAMGEE, F.R.S.E., etc. Second edition, 8vo., pp. ix., 364. With 44 engravings on wood. Philadelphia: P. Blakiston, Son & Co., 1883.

IT is now so many years since Mr. Gamgee first enunciated his views in regard to the principles most conducive to repair of surgical injuries,

that the mention of his name suggests at once the thought of his formula, "rest, compression, dry and infrequent dressings." For this reason, on taking up a book by him with such a title as is given above, one might expect to find it simply an argument for his peculiar views, enforced by illustrations drawn from his own experience. Such, indeed, in a sense, the book is; but it is much more. The principles of the author in regard to surgical dressings infuse it everywhere, but everywhere it is full of instructive and suggestive ideas, the value of which is intrinsic, and a clear surplusage to whatever may be the value of the more proper line of discussion.

The present volume is a consolidation of one *On the Treatment of Fractures*, published in 1871, and one *On the Treatment of Wounds*, published in 1878; a consolidation in which some recasting has taken place, and the whole completed by the addition of a section giving plain and practical directions how to carry out the method which the author advocates. Its form is what its title would lead one to expect, but it is systematic and loses nothing by its colloquial style. It opens with a chapter on the general analogy between wounds of the soft and those of the hard tissues—wounds and fractures, as the author puts it. In this, illustrations of the treatment of simple, compound, and complicated fractures are set side by side with illustrations of the treatment of contusions, simple incised wounds, gunshot and splinter wounds, and the removal of benign and inflamed tumours. The course and issue of these cases are compared in order to show their analogies. Here, at once, we come upon some of those side-lights referred to, which help to explain Mr. Gamgee's success as a surgeon. Attention to details is commended, not in a perfunctory, but apparently in a very sincere way. The injunctions in regard to the application and removal of adhesive plasters, for example, though by no means novel, somehow give the impression that the author means them, and that it would not be safe for a dresser in his hospital to do what we have seen done elsewhere, viz., put a sticking plaster dressing for fractured clavicle over a very hairy chest, and afterward rip it off as if the patient's skin had no more feeling than that of a hair trunk. And though it is not a discovery of Mr. Gamgee that patient attention and gentleness are not only conducive to the comfort of the patient, but also to the success of the surgeon, it is a truth that might be more widely known and practised upon than it is.

The second chapter treats of the arrest of hemorrhage. Many ligatures are not commended, but only the fewest number possible, together with torsion, pinching, and the use of styptic colloid, dry compression and position. Aneurysm is recommended for suitable cases, and Mr. Bryant's experience with torsion—"Up to 1874, 200 consecutive cases of amputation of the leg, thigh, arm, and forearm, in which all the arteries were twisted (110 of them having been of the femoral artery), and no case of secondary hemorrhage"—is cited in favour of this method. Nevertheless, it does not appear that Mr. Gamgee has acquired confidence enough in it to adopt it for closing large arteries.

The third lecture is on sprains, and presents the merits of immobilization, compression, and position in their treatment.

The fourth, fifth, and sixth lectures are on fractures of various kinds. In these no principles are laid down different from those of general acceptance, except that more stress is laid on gentle but firm compression than is usual; and the author emphasizes the fact that provisional callus

is an accident of and not essential to union of a broken bone. The cases which illustrate this part of the book show how successfully the author's principles may be used in cases apparently most unpromising. At the same time he candidly mentions instances where they did not succeed, and where other measures for the reunion of obstinate fracture had to be adopted. In regard to details, we note the author's advice that blebs forming under dressings should not be opened, but simply included in the cotton-wool dressing, and left to take care of themselves. Incidentally we are told that Mr. Gamgee relies, for the treatment of delirium tremens, upon twenty-grain doses of bromide of potassium and forty-drop doses of tincture of digitalis, repeated as frequently as necessary and as permitted by the general strength. Antimony, in doses of half a grain to a grain every three or four hours, he thinks also very valuable. He is opposed to the plan of treating fractures with much swelling by waiting till this has declined before applying an apparatus. Here he thinks his principle of moderate compression is peculiarly indicated.

We have used the word "moderate" just now in order to prevent the possibility of a misunderstanding which it seems there have been people stupid enough to entertain. For Mr. Gamgee has to stoop to answer a reviewer, who sagely remarked, *à propos* of this, that he would "shrink from applying powerful constriction to an entire limb in which any considerable amount of true inflammatory swelling was taking place." This of one who says:—

"Pad the whole limb evenly, immobilize with accurately fitting moulds, apply these soft bandages, with lightness at each turn, and rely for firmness on equally distributed pressure and repeated intersecting spirals. Pay especial attention to physiological position, and hold pain in reverential awe. Never look upon pain as a sentimental evil, but as an expression of organic mischief. Patients with fractures when properly treated are in comfort, and if they are not it is your duty to find out the cause and remedy it."

Mr. Gamgee justly exclaims against the much more real dangers of the ordinary splints and other apparatus, those heavy, ungainly, hot, and painful loads with which many patients are burdened.

In the chapter which treats of compound fractures, the same method, comprising cotton padding, regulated compression, and a moulded apparatus, is recommended, and some astonishing cases are cited to prove its efficiency. The same may be said of amputation after crushing injuries. In which connection a warning against being too ready to amputate is given, and the famous case of Percival Pott, who came near having his leg cut off unnecessarily, is cited.

The seventh lecture treats of wounds into joints, in regard to which the first caution is one, by no means uncalled for, against excessive diagnostic inquisitiveness. The treatment recommended is closure—by sutures if necessary—dry dressing, moderate compression, and immobilization. Where inflammatory action has already begun the introduction of a drainage-tube may be required.

In the eighth lecture there is some explanation and illustration of the philosophy of the method Mr. Gamgee advocates. Accurate and immovable coaptation of divided surfaces is said to be the essential thing; infrequent dressing is but a corollary of the principle of absolute rest. That these are not novel truths is shown by references to older writers and surgeons, who, without formulating their views just as Mr. Gamgee does his, were guided in their practice by the same principles.

In the ninth lecture the general applicability of dry and absorbent dressings is dwelt upon, and the unwise use of poultices and water dressings is deprecated.

The tenth lecture is devoted to drainage and mode of suspension. Drainage-tubes, the author reminds us, were suggested to Chassaignae by observing the way farmers drain boggy land with earthenware pipes. He gives excellent instructions as to the way they should be used, and remarks on the assistance they may receive from position. Suspension, as a means of securing the advantage of position and of allowing motion without disturbance of fragments or cut surfaces, is described and illustrated with some very good cuts.

The eleventh lecture treats of wounds of the scalp and skull. In regard to these the advice given is to avoid interference as much as possible. A number of apparently desperate cases of depressed fracture are cited where recovery followed upon the use of dry dressings with ice. Mr. Gamgee inclines to the opinion, which he begs may be accepted "with much reservation," that in compound and depressed fracture of the skull, without brain symptoms, the trephine should not, as a rule, be used. If constitutional or local symptoms warrant the belief that blood or pus is collected under the meninges, or that a fragment of bone is pressing upon the seat of injury, he thinks the use of the trephine "may be justifiable." He appropriately remarks that on this question some of the greatest surgeons have been arrayed on opposite sides; and adds that the subject is one in which disinclination to dogmatize grows with experience. He quotes and cites a large number of surgeons to show the superiority of non-interference, and calls attention to the singular fact, that while the English and Americans are quite free with the use of the trephine, French, German and Italian surgeons rarely employ it. He then quotes a number of modern English writers and one American—Dr. Stimson (with his name misspelled)—in favour of the trephine. In conclusion, after a rather ambiguous statement of his own opinion, he gives three cases where he used the trephine in which the results were all that the most ardent advocate of interference could desire.

This subject is, as Mr. Gamgee says, one in regard to which doctors disagree. A little over a year ago it was brought before the American Surgical Association, meeting in Philadelphia (see *The Medical News*, June 10, 1882), by Dr. Moses Gunn, of Chicago, who advocated operative interference in all recent fractures with depression, whether simple or compound, even though entirely without symptoms of compression. The majority of those who discussed this proposition expressed similar opinions. There were, however, three very important opponents of these views. Dr. Hunter McGuire, of Richmond, thought that if a fracture is simple, and the amount of depression not enough to bring on symptoms of compression, the surgeon had better let it alone, and trust to the brain accommodating itself to the change. Dr. R. A. Kimloch, of Charleston, shared this view; and Dr. S. W. Gross, of Philadelphia, advocated non-interference in cases of moderate depression, except where there were evidences of irritation pointing to a depression of the internal table of the skull. In regard to one's attitude toward this question, very much appears to depend upon the temperament of each surgeon.

The twelfth and last lecture of Mr. Gamgee's book is occupied with a discussion of what has come to be called "antiseptic" surgery. The claim that its success depends upon its adaptation to the so-called germ theory

of Pasteur, is combated. The origin of this adaptation is traced back to Déclat, six years before Lister's first essay. Its results are shown to be no better than those of various other methods which take no note of "germs." The key-note of Mr. Gamgee's views is found in the paragraph: "Life and putrefaction are not correlative, but antagonistic; and in proportion as the surgeon utilizes and economizes the attributes of life, he will find himself independent of those changes which are inherent to decaying organic matter; whether it be in bagging wounds or boggy lands. *Life is the great antiseptic*" (italics ours). He has no fear of "impalpable and implacable germs," and he politely ridicules the language in which those who do fear them warn against the slightest failure to carry out all the details of "Listerism." In doing this he does not detract from the value of antiseptics; it is the formulated association of these with the "germ theory" which he deprecates. In all he is guilty of no discourtesy to Mr. Lister, in whom he recognizes a single-minded enthusiasm, combined with rare accomplishments as a chemist, a microscopist, a naturalist, and a surgeon.

The concluding part of the book before us is occupied by a chapter and an "addendum," giving practical directions in regard to the materials and apparatus recommended by Mr. Gamgee, and how to use them. Into the details of this we have not time to enter; but we may refer to it as an indispensable and exceedingly valuable addition to what has gone before it.

The book has also an index which adds to its value.

From what has been said, it will be seen that we have here a book of unusual interest. As the mere exponent of the views of an able and experienced surgeon, it would be entitled to respectful attention, but it has a still better claim in its intrinsic value. It is not only eminently instructive, but also suggestive. Its style is clear and logical, its spirit genial and attractive. Whether discussing a mooted point, or speaking of the consideration which every surgeon should have for his patient's feelings, there is constantly revealed the warm, kind heart of a polite and humane man. While writing to establish what he believes to be a great principle, the author has not despised bestowing scrupulous attention upon details often erroneously regarded as of minor importance. Many instances of this could be cited, of matters often overlooked or neglected; but we will only refer to his suggestions as to the use of collodion for obtaining pressure, which has a larger field of usefulness than is often suspected; as to the importance of having slings for the forearm so arranged as to keep the elbow at an acute angle—the hand higher than the elbow—which is constantly violated; as to the use of adhesive straps in certain injuries, to control hemorrhage; as to inquiry for and correcting of constipation; as to the significance of the appearance of discharges; as to keeping temperature charts out of sight of patients, so that they may not have the alarm which changes might cause; as to personal supervision after operations; as to the value of temporary digital compression to control pain and allay inflammation. These and the way they are put are features of the book which add to the feeling of respect for the author that of regard for the man. It is a privilege to read such a book, and a pleasure to commend it to others.

C. W. D.

ART. XXX.—*Handbook of Electro-Therapeutics*. By Dr. WILHELM ERB, Professor in the University of Leipzig. Translated by L. PUTZEL, M.D. With thirty-nine wood-cuts. 8vo. 366 pages. New York: Wm. Wood & Co., 1883.

WORKS on electro-therapeutics are becoming so numerous that it is difficult to keep pace with them. Professor Erb has long been known as a scientific worker in electro-therapy; and, in addition, has a reputation in general neurology that is almost world-wide, so that any work from his pen is sure to have merit. In the physical and physiological introduction, and in the applications of physiology to electro-diagnosis are found many evidences of the author's ability and originality. It is well known that to Professor Erb the term "degeneration reaction," and most of our exact knowledge of this reaction, are due; and in the present treatise he carefully describes and expounds this subject both with reference to typical and atypical cases.

The defects of the book are diffuseness, the recital in detail of too many cases, and claiming too much for electricity as a therapeutical agent.

Particular attention is given to the technique of electro-therapeutics. Many cases illustrating unusual beneficial effects of electricity have been brought together from periodical literature. The book will prove highly satisfactory to those desiring both a scientific and practical exposition of electro-therapeutics.

C. K. M.

ART. XXXI.—*Observations on Lithotomy, Lithotripsy, and the Early Detection of Stone in the Bladder; with a Description of a New Method of Tapping the Bladder*. By REGINALD HARRISON, F.R.C.S., etc. 8vo. pp. 71. London: J. & A. Churchill, 1883.

In a review of Mr. Harrison's "Lectures on the Surgical Disorders of the Urinary Organs," which we published in January, 1882, we made the remark that "it is surprising to an American, meeting the names of Gouley, Otis, Keyes, etc., to miss that of Gross." In contrast to this, the first thing we observe, on opening the book before us, is that it is dedicated to Professor Gross, with most complimentary and respectful expressions. A short, twelve-line preface follows, and the author plunges at once *in medias res*.

Mr. Harrison's observations, he tells us, are founded upon an experience embracing no less than sixty operations of cutting and crushing. And it is especially as the result of experience, and of a manifestly careful and conscientious spirit, that these observations have a value for the surgeon. The book, indeed, is not like a text-book for students, but like a paper intended to be read before the author's associates, from which much instruction may be gathered, but in which there is nothing of the pedagogic spirit discoverable. For this reason a review of it ought to be conducted as one's remarks might be, who was called upon to speak at a meeting after such a paper had been read. Such a one might differ from the

author as to certain details, but for his essay, as a whole, he could only entertain a high respect. He might, for example, suggest that a little more exact knowledge in regard to the *technique* and merits of suprapubic lithotomy would have prevented the author from giving the impression that an incision through the perineum is a necessary or even an ordinary part of it, and he might regret that the renal origin and uric acid nucleus of most calculi should, by implication, seem to be ignored. But the remarks on the subject of lithotomy and lithotripsy in general, he would acknowledge to be both instructive and suggestive.

More than two-thirds of this book are devoted to the field of lithotripsy, which in Great Britain has so largely superseded lithotomy, and which has of late received so great an impetus from the adoption of the instruments and method of Prof. Bigelow. In regard to the latter, an ill-concealed allusion is made to the reluctance to recognize its merits on the part of the most distinguished advocate of the old method of lithotripsy in Great Britain, and the author's own appreciation of them is most unequivocally stated.

Mr. Harrison's views in regard to the principles which should guide the surgeon in the choice of a method of operation—cutting or crushing—are conservative and judicious. So are his remarks in regard to the early detection of stone in the bladder.

The "New Method of Tapping the Bladder," mentioned in the title of this book, consists in thrusting a trochar and canula through the perineum and prostate gland. A peculiar instrument, specially adapted to the purpose, is described and figured, and the endorsement of Professor S. D. Gross—which is contained in the sixth edition of his *System of Surgery*—is given.

As remarked at the beginning of our review, this book is not a text-book, and so is not suited to the needs of the average student, but for the surgeon it is just the thing. In manner it is most pleasing—in matter it is most suggestive.

C. W. D.

ART. XXXII.—*Anatomy, Descriptive and Surgical*. By HENRY GRAY, F.R.S., with the collaboration of T. HOLMES, M.A., H. V. CARTER, M.D., and T. PICKERING PICK. A new American, from the tenth English edition. To which is added *Landmarks, Medical and Surgical*, by LUTHER HOLDEN, F.R.C.S., with additions by W. W. KEEN, M.D. 8vo. pp. xxxii., 1023. Philadelphia: Henry C. Lea's Son & Co., 1883.

BUT little need be said of this book save that it is the *tenth edition*. Saying this only we say very much, for few books have such a vigorous life. The present edition has undergone careful revision, some of the sections on microscopical anatomy have been altered or entirely rewritten, and several of the illustrations have been bettered, and a few additional ones added.

Of all the many text-books on anatomy, this has been ever since its issue in 1858 *facile princeps*, and we see no reason why it should lose its rank.

W. W. K.

QUARTERLY SUMMARY

OF THE

IMPROVEMENTS AND DISCOVERIES

IN THE

MEDICAL SCIENCES.

ANATOMY AND PHYSIOLOGY.

Primary Radicles of the Lymphatic System.

A METHOD for measuring in a satisfactory manner the primary radicles of the lymphatic system has been vainly sought for during the past three centuries. M. SAPPEY has recently read a paper before the *Académie des Sciences*, in which he states that he has discovered a method by which they can be clearly seen. His method demonstrates that the vessels of which this system is composed originate in the tissue of the organs by minute capillaries, the calibre of which does not exceed 1 mm. ($\frac{1}{25000}$ inch), that these capillaries freely inosculate, and that at the level of their communications there exist very minute starred enlargements or swellings (lacunæ). A network of these minute capillaries and lacunæ represents the primary radicles of the lymphatic system. The chief cause of the failure to demonstrate these radicles heretofore is due to their perfect transparency. M. Sappey has succeeded in giving the capillaries and lacunæ a pale yellow colour, which enabled him to demonstrate them. This was done by filling these cavities with a quantity of the lowest order of vegetations of the lowest order of cryptogams. These microphytes, generally recognized as microbes, are sharply outlined. They differ markedly both in outline and configuration, but may be classed under two principal groups, the one having the form of rounded and brilliant cells, and belonging to the micrococceus family, the others elongated and cylindrical, belonging to the bacteria family.

If the microbes proliferate rapidly in the plasma of lymph, they grow with equal rapidity and abundance in blood serum, and if their presence is necessary for a demonstration, it is important that they should appear in the lymphatic capillaries only, and not in the blood capillaries. In order to prevent this accident he injected the blood capillaries with an acidulated liquid, sufficiently abundant to carry away their contents; in other words, he substituted for the blood plasma, a favourable medium for the development of the microphytes, a solution in which they cannot proliferate, with the result that no vestige of them could be found in the blood capillaries. The primary radicles of the lymphatic system, filled, on the contrary, with coloured cells, were alone seen in the field of the microscope, and so clearly, in fact, that they could be studied in their entirety, and as to their smaller details, and most minute variations.

Is there a communication between the primary lymphatic radicles and those of the blood capillaries? At the beginning of his studies on the absorbent vessels, M. Sappey believed it, and developed this opinion in his works. In admitting this communication and supporting it, he acted on general considerations deduced from normal and pathological anatomy; he had no observed fact to support this view. But he now declares that by a certain procedure the closest *connections* of the lymph and blood capillaries can be seen. The latter are of so large a calibre as compared with the former that they may be likened to the trunks of trees, and the lymph capillaries to climbing plants embracing all parts of the tree, the lacunæ representing the leaves of the climbing plants. When a preparation is examined at the moment of immersion in the reagent for bringing out the lacunæ, at first the blood capillary only is seen. Then, under the influence of the reagent, lacunæ appear here and there: the blood capillary gradually disappears as the lacunæ become more and more visible. During this successive appearance and disappearance of the lymph and blood capillaries, there is a moment when the observer can distinguish, at the same time, the two kinds of vessels, and in the best conditions for observing their communications if they exist. But even in these favourable conditions it has so far been impossible for him to see the slightest communication between them. From these new and concise facts, and apart from all deductions, he concludes that there is no reason for admitting an intercommunication; the lymphatic vessels are hermetically sealed. Blood plasma penetrates the primary radicles by simple transudation or by capillarity, by undergoing only slight modifications.

The histological characters of the primary radicles differ according as one considers the network of the lacunæ and minute capillaries or the subjacent network. The superficial network is composed of an *ensemble* of cavities, the walls of which have, apparently, no endothelial cells. Nitrate of silver, which acts so readily in bringing out these cells in other parts of the circulatory apparatus, has no effect on the minute capillaries and the lacunæ. Their walls are formed simply of an amorphous (structureless?) membrane. The collecting network under the preceding has a more complex texture. On the vessels composing it are seen endothelial cells easily shown by nitrate of silver. These cells form a continuous sheath which lines the internal surface of the proper or structureless membrane. The wall of the sub-papillæ vessels or collectors is composed, then, of two layers. As to the existence of a muscular structure in these two layers, M. Sappey cannot speak with certainty. He has not seen the slightest trace of such structure, and from a uniform failure to see it after repeated trials he thinks that he is justified in saying that no such structure exists at the origin of the lymphatic vessels nor for some distance from their origin.—*L'Union Méd.*, June 23, 1883.

A New Centre of Vision in the Human Eye.

For a long time M. DELBŒUF has observed that sensibility for light is greater at the periphery than at the centre of the retina. If one uses a vacillating flame, such as given by a candle, it will be seen that, though there may be but little light on the book or paper immediately before the eye, there is a dazzling, sometimes almost insupportable glare, on the other white papers on the table, seen by indirect vision. Or the reader may turn his back to the window, holding in the hand a white paper almost horizontally, and a slightly movable shadow is seen projected on the paper, the movements of the shadow being more visible if the eyes are directed to the top or the sides.

After a series of experiments on this subject M. Delbœuf draws the following conclusions:—

1. The macula lutea, of which the visual acuity is greater than that of any other part of the retina, has less sensibility for the differences of brightness.
2. The part of the retina most sensible to luminous differences is a line situated in the vertical meridian, and commencing about 30° from the macula lutea, and extending, in most of the eyes examined, as far as 60° and over, from it.
3. Beyond this line the sensibility goes on decreasing, but in such a manner that the maximum lines of each meridian enclose the macula lutea, remaining within the limits of 30° – 20° of it.
4. The sensibility is, generally speaking, greater in the internal and superior demi-meridians.
5. Save personal differences, the two eyes appear to be organized symmetrically as far as this special sensibility is concerned.—*Revue Scientifique*, August 11, 1883.

Kymographic Measurements in Men.

Of all the methods, says Prof. E. ALBERT, of Vienna, which have hitherto been employed for determining the blood-pressure and obtaining true traces, the registering kymographion of Ludwig is the best and most productive of true results. Heretofore, experiments with this instrument have only been made on animals. Dr. Albert has recently, however, recorded cases in which the experiment was made on the human subject, before amputation of a limb. A disinfected canula was bound into a vessel. All the experiments were made in cases in which the thigh or the leg had to be amputated. The experiment only lasted a few minutes in most of the cases. The vessel chosen was the anterior tibial artery, on account of the ease with which it could be reached. The subject was slightly narcotized, the instrument applied, and the anæsthetic removed while the tracing was taken. In one case there was an abnormality of the heart; the tracings in this case had a special value.

The tracings taken by Prof. Albert oppose the assertions of Schapiro and Thomayer that the blood-pressure is higher in the erect than in the sitting posture. The blood-pressure was regularly increased when the epigastrium of the patient was raised. It is possible that when the upper part of the body was raised up the abdominal viscera were pressed on, and a portion of their blood sent into the right heart, by which the pressure was raised. In the erect position it may be possible, on the other hand, that so much blood is collected in the veins of the abdominal viscera and upper extremity that the aortic pressure is lowered. The blood-pressure during the passive upright position of the upper part of the body was between 10 and 20 mm. of mercury, and remained so as long as the subject was left in that position. Even a very slight elevation of the body gave a different result. In one case the pressure was raised when the subject coughed, which explains why the act of coughing may produce hæmoptysis. It may be mentioned, also, that morphine not only allayed the cough irritation, but lowered the blood-pressure. In two cases in which the other lower extremity was enveloped by an Esmarch's bandage during the experiment the blood-pressure was raised about 15 mm. As a rule there was but slight variation during the respiratory act; only in a few cases was there marked indication of the respiratory rhythm. This may be partially explained by the fact that the breathing of the patient was very quiet. This regular blood-pressure under the anæsthetic indicates that the present methods of producing narcosis are approaching perfection. Three plates are given, indicating some of the results obtained. The mean blood-pressure in six cases was between 100 and 160 mm.—*Medizin. Jahrbücher*, 1883, Hft. ii.

Physiology of the Bladder and Rectum.

The following are the physiological conclusions drawn by Mr. F. LE GROS CLARK at the close of an interesting paper on this subject:—

1. The muscular coat of the bladder acts under the government of the will, but is also subject to reflex influence.

2. The abdominal muscles take no necessary part in the expulsion of the urine.

3. In early life the action of the bladder is chiefly reflex, but is gradually rendered voluntary by education and habit.

4. The retaining power of the bladder is due (a) in great measure to the hydrostatic law, in accordance with which the egress of fluid from a reservoir through a small tube is determined; (b) to the elasticity and (?) muscularity of the urethra; (c) to its compression, whilst under the arch of the pubes, by the compressor urethræ muscle.

5. The annular fibres around the neck of the bladder have not a sphincter action.

6. Incontinence or retention of urine may be referred to excessive or deficient sensitiveness of bladder, ill-regulated control, atony, mechanical obstruction. When violence is inflicted on the nerve-centres—either brain or spinal cord—the bladder may be rendered partially or wholly incapable of expelling its contents. In lesion of the brain this incapacity is proportioned to the profundity of the coma, and due to insensibility and suspension of voluntary power. In compression of the cord the cause is the same, but operates by interruption of the afferent and efferent currents; and the reflex energy of the cord is also impaired.

7. The rectum is guarded at its outlet by two sphincter muscles, one cutaneous and chiefly voluntary, the other intestinal and spinal-reflex. In compression of the brain the former is almost or entirely disabled; in compression of the cord the power of the latter is likewise impaired.

8. Where an appeal is made, through common sensation, to the nerve-centres, it is not consistent with our physiological knowledge to exclude volition from participating in the origination of the motor force which is evoked by that appeal.

In the preceding pages, the nature of my subject has compelled me to assume as probable some things which do not admit of demonstrative proof; and where this is the case, I have expressed myself accordingly. But if my views are such as to satisfy physiological criticism, I may venture to claim for them the further recommendation that they afford a reasonable explanation of some of the otherwise obscure pathological phenomena presented by the excretory urinary organs.—*Journ. of Anat. and Physiol.*, July, 1883.

MATERIA MEDICA AND THERAPEUTICS.

Physiological Action of Barium Chloride.

Drs. SIDNEY RINGER and HARRINGTON SAINSBURY have recently published the results of their experiments as to the action of barium chloride on the animal organism. The question to be decided was whether barium acts directly on the tissues in which it manifests itself, or indirectly on these through the medium of the nerves?

They briefly recapitulate the steps in their argument as follows:—

1. We have the experiments of Boehm showing the systolic heart, the retarded pulse-rate, and the heightened blood-pressure, resulting from barium chloride action.

2. We find that the systolic heart and the retardation occur equally when the centres of reflex control are destroyed.

3. We find that the local application of the salt, in diluted solution, to the heart *in situ*, produces local spasm at the point of application; and also that the excised heart is arrested in full systole by the drug.

4. We find that the vessels freed from central nervous control respond to the direct action of the salt.

5. We find that we are unable to influence the calibre of the vessels through the nerves apart from direct local action.

We here see that the action on the heart is a guide to the action on the arteries, or *vice versa*, and this we should feel inclined to expect: since, on tissues resembling one another, we should look for a resemblance of effects. This question will be gone into more fully in a paper shortly to be published, on the digitalis group generally, in respect of which the experiments were conducted after the same methods described here.

To the marked resemblance in action between barium chloride and digitalis we need scarcely draw further attention. Boehm pointed it out, and it is sufficiently manifest. But of the alternative which he gave us for barium chloride action, viz., either action on the whole sympathetic system, or on unstriped muscular tissue generally and specifically, we must choose the latter.

The therapeutic value of barium chloride yet remains to be determined; the drug is clearly a very powerful one, and in this respect is widely separated from its chemical analogue calcium chloride. As to the directions in which clinical observation should extend, we get a clear indication from the digitalis-like action of the drug.—*British Med. Journ.*, August 11, 1883.

— *Action of Saline Cathartics.*

Mr. MATTHEW HAY, of Edinburgh, at the close of a long and exhaustive article on this subject, draws the following conclusions:—

1. A saline purgative always excites more or less secretion from the alimentary canal, depending on the amount of the salt and the strength of its solution, and varying with the nature of the salt.

2. The excito-secretory action of the salt is probably due to the bitterness as well as to the irritant and specific properties of the salt, and not to osmosis.

3. The low diffusibility of the salt impedes the absorption of the secreted fluid.

4. Between stimulated secretion on the one hand, and impeded absorption on the other, there is an accumulation of fluid in the canal.

5. The accumulated fluid, partly from ordinary dynamical laws, partly from a gentle stimulation of the peristaltic movements excited by distension, reaches the rectum and produces purgation.

6. Purgation will not ensue if water be withheld from the diet for one or two days previous to the administration of the salt in a concentrated form.

7. The absence of purgation is not due to the want of water in the alimentary canal, but to its deficiency in the blood.

8. Under ordinary conditions, with an unrestricted supply of water, the maximum amount of fluid accumulated within the canal corresponds very nearly to the quantity of water required to form a 5 or 6 per cent. solution of the amount of salt administered.

9. If, therefore, a solution of this strength be given, it does not increase in bulk.

10. If a solution of greater strength be administered, it rapidly increases in volume until the maximum is attained. This it accomplishes in the case of a 20 per cent. solution in from one to one and a half hours.

11. After the maximum has been reached, the fluid begins gradually and slowly to diminish in quantity.

12. *Cæteris paribus*, the weaker, or in other words, the more voluminous the solution of the salt administered is, the more quickly is the maximum within the canal reached; and accordingly purgation follows with greater rapidity.

13. Unless the solution of the salt is more concentrated than 10 per cent. it excites little or no secretion in the stomach.

14. The salt is absorbed with extreme slowness by the stomach of the cat.

15. The salt excites an active secretion in the intestines, and probably for the most part in the small intestine, all portions of this viscus being capable of yielding the secretion in almost equal quantities.

16. The bile and pancreatic juice participate but very little in the secretion.

17. The secretion is probably a true *succus entericus*, resembling the secretion obtained by Moreau after division of the mesenteric nerves.

18. The secretion is promoted by local irritation of the intestine, as by ligatures, but only in the immediate vicinity of the irritation.

19. Absorption by the intestine generally is reflexly stimulated by such irritation (the effect of numerous ligatures applied at points remote from the seat of the injected salt being to diminish the amount of purgative fluid by accelerated absorption).

20. If the salt solution be injected directly into the small intestine, the stronger within certain limits the solution is, the greater will be the accumulation of fluid within the intestine.

21. This difference is not observed when the salt is administered *per orem*, as the strong solution becomes diluted in the stomach and duodenum before passing into the intestine generally.

22. The difference is due to the local action of the salt on the mucous membrane, and probably more to an impeded absorption than to a stimulated secretion.

23. When the salt is administered in the usual manner, it appears, in the case of the sulphate of magnesia and sulphate of soda, to become split up in the small intestine, the acid being more rapidly absorbed than the base.

24. A portion of the absorbed acid shortly afterwards returns to the intestines.

25. After the maximum of excretion of the acid has been reached, the salt begins very slowly and gradually to disappear by absorption, which is checked only by the occurrence of purgation.

26. During the alternations of absorption and secretion of the acid, it is the salt left within the intestine which excites secretion, the absorbed and excreted acid exerting no such action whilst in the blood, or during the process of its excretion, as Headland believed.

27. The salt does not purge when injected into the blood, and excites no intestinal secretion.

28. Nor does it purge, when injected subcutaneously, unless in virtue of its causing local irritation of the abdominal subcutaneous tissue, which acts reflexly on the intestines, dilating their bloodvessels, and perhaps stimulating their muscular movements.

29. The sulphate of soda exhibits no poisonous action when injected into the circulation.

30. The sulphate of magnesia is, on the other hand, powerfully toxic when so injected, paralyzing first the respiration and afterwards the heart, and abolishing sensation or paralyzing the sensory-motor reflex centres.

31. Both salts, when administered in the usual manner, produce a gradual but well-marked increase in the tension of the pulse.

32. According as the salt-solution within the intestine increases in amount, there occurs a corresponding diminution of the fluids of the blood.

33. The blood recoups itself in a short time by absorbing from the tissues a nearly equal quantity of their fluids.

34. The salt, after some hours, causes diuresis, and with it a second concentration of the blood, which continues so long as the diuresis is active.

35. As the intestinal secretion excited by the salt contains a very small proportion of organic matter as compared with the inorganic matter, the purgative removes more of the latter than the former from the blood. In certain cases a large quantity of the salts of the blood is thus evacuated.

36. The amount of the normal constituents of the urine is not affected by the salt.

37. After the administration of sulphate of magnesia much more of the acid than of the base is excreted in the urine.

38. The salt has no specific action in lowering the internal temperature of the body, or has it only to a very small extent.

39. It reduces, however, the absolute amount of heat in the body.—*Journal of Anat. and Physiol.*, July, 1883.

— *Action of Piperidin.*

FLIESS, in an article in a recent number of the *Archiv für Anat. und Physiol.*, gives the results of some researches he has made on this substance. He finds that if a dose of piperidin be subcutaneously injected into a frog, after a short period of unrest the animal remains remarkably quiet, and no longer moves when the foot is pinched, and that this is not due to lesion of the muscles or to paralysis of the motor nerves is shown by the vigorous movements that are made if the sciatic nerve be stimulated by an induced current. Paralysis of the sensory nerves must, therefore, be the cause of the lack of response of the animal to sensory stimuli, and the question arises whether it is the nerve or the centre that is paralyzed. The loss of reflex excitability takes place about ten or twelve minutes after the injection of one milligramme of piperidin, and is so complete that even its contact with the eye fails to elicit any response. Recovery of the sensibility occurs at the expiration of twenty-four hours. It has been rendered probable by Kronecker's and Sterling's experiments that a single shock is insufficient to excite a reflex action, and that at least two are required, which must be separated by a short interval only. In his experiments with piperidin, however, Fliess found that the time which elapsed between two shocks in order that a reflex movement should be induced was not altered, but only that the shocks must be much stronger. Hence he arrives at the conclusion that it is not the centre which is acted on by the piperidin, but the conducting agent—the nerve. The paralysis of the sensory nerves only occurred in those parts of the body to which the blood impregnated with piperidin was distributed; in any part of it protected from the action of such blood the sensory fibres retained their function. Further experiments demonstrated that the part of the sensory nerves on which piperidin acts is their peripheric termination. All the experiments proved that neither the muscles nor the motor nerves were in any way affected.

Other results observed after the subcutaneous injection of one milligramme of

piperidin were that the frequency of respiration fell to one-half the normal amount—that is, from 60 to 36 and 30 per minute. Large doses led to the Stokes' phenomenon, respiration being interrupted for two or four minutes, after which the frog made from three to four respirations. In regard to the cardiac beats, their number similarly fell to about two-thirds of the normal, from 54 to 34 per minute.

Fliess further made some observations on the action of piperidin on warm-blooded animals, but did not find that its effects, in the rabbit at least, were nearly so well marked, even though fatal doses were administered, and this he attributes in part to the circumstance that piperidin oxidizes with extraordinary rapidity in the body. The frequency of respiration was considerably reduced, the number falling from 200 to 48 per minute, whilst the cardiac beats rose from 220 to 340 per minute, so that it would appear that the vagal centre was paralyzed. The pupil became widely dilated, and the heart, when death occurred, was arrested in systole. Fliess appends the results of some other experiments he made on acetyl piperidin, benzyl piperidin, and methyl piperidin; also of some experiments on coniin.—*Lancet*, July 28, 1883.

Iodoform.

Dr. HOFMANN, at the conclusion of a paper on the surgical uses of iodoform, draws the following conclusions:—

1. Iodoform is an excellent disinfectant, and, as a rule, is a painless application to wounds.

2. On account of its slight solubility, it is of little value in complicated wounds of cavities.

3. It does not prevent the occasional outbreak of erysipelas.

4. It is not a specific against serofulous or tuberculous processes, and develops its healing properties most notably in ulcerous processes.

5. By keeping wounds fresh and clean, it furthers granulation, though it has but little influence on the final cicatrization of the wound.

6. Very thin layers of powdered iodoform do not hinder union by first intention.

7. In pharyngeal and laryngeal diphtheria of children, iodoform does not give much better results than other antiseptics.

8. In wounds and ulcers of the mouth, rectum, and vagina, as well as in open, easily accessible wounds in the cavities of bones, iodoform, in the form of a 30 to 50 per cent. iodoform gauze, is an excellent antiseptic dressing.

9. Parenchymatous injections of iodoform generally cause a great deal of pain, and it cannot be said that they give very excellent results in fungous diseases of joints and glandular swellings.

10. Iodoform ointments and plasters are often of good service in parenchymatous goitres and chronic swellings of glands, joints, and tendons.

11. Iodoform in large quantities is undoubtedly dangerous, and is more productive of good results, and less hurtful in small doses.

12. Childhood is not a contraindication for the use of iodoform.

13. The preliminary cleansing of fresh wounds with weak carbolized water before using the iodoform dressing is of no advantage so far as Hofmann's experience goes.

14. The healing of serofulous and tuberculous sores by iodoform does not prevent their return.

15. Iodoform is an excellent means for the thorough removal of disagreeable odours of neoplasm which do not admit of operation.

16. The occasional syringing of suppurating cavities with small quantities of iodoform emulsion will often have a favourable action on the quality and quantity of the pus.

17. The introduction of iodoform bougies into the urethra and bladder will often alleviate pain, as also in vesical tenesmus and suppurative conditions of the bladder, and will exert a favourable influence on those conditions of the urine in which rapid decomposition takes place.

18. The application of iodoform bougies to long fistulæ of the soft parts is more hurtful than useful, as the fistulæ are only stopped up, and the products of decomposition are not discharged. Equally unwise is the filling up of the mouth of a fistula with dry powdered iodoform.—*Medizin. Jahrbücher*, 1883, Hft. ii.

Anæsthetic Action of a Mixture of Air and Chloroform.

M. PAUL BERT has recently communicated the results of further experiments on this subject to the *Académie des Sciences*. His experiments were made with an apparatus composed of two gasometers, acting alternately. A dog was made to respire a mixture of the proportion of 3j of chloroform, vapourized in 30 gallons of air. The animal remained sensible during the whole time, which was prolonged in one case for 9½ hours. The rectal temperature fell to 98° Fahr. With a mixture of 3jss of chloroform, vapourized in 30 gallons of air, death took place after about seven hours' inhalation, with a temperature of 87.8° Fahr. Sensibility persisted during the whole time, but was much feebler when the animal became cold. With 3ij in 30 gallons of air, insensibility of the skin and cornea was obtained, but it came on slowly after some agitation. Death took place in about 6 hours, the temperature having fallen to 86° Fahr. With 3ijss to 30, insensibility appeared in a few minutes. The sleep was absolutely calm, and death took place in about 2 or 2½ hours, without convulsions. The temperature was 91.4° Fahr. With a mixture of 3iiij—30, insensibility was more rapid with no reaction; death in 1¼ hour, temperature 95°. With a mixture of 3ijss and 3iv to 30, death occurred in forty-five minutes, temperature 100.4°. With 3ivss and 3v to 30, death occurred in 30 minutes; and in a few minutes when a mixture of 3vijss to 30 was used. Tracheotomy was performed in every case before the experiment. The chloroform was pure. M. Bert calls attention to the following facts: 1. Whether death comes on slowly or quickly, the heart always continued to beat after respiration had ceased; there was never any cardiac dyspnoea. 2. There was no chloroform in the urine except after anæsthesia of several hours. 3. With very small doses, one may cause an enormous quantity of chloroform to circulate in the lungs, with no other objective phenomenon than a fall of temperature. 4. With slightly increased doses one may cause slow death with great lowering of temperature; but sensibility persists. In these doses chloroform acts only on the nutritive functions, probably by benumbing the anatomical elements, just as beer acts according to the experiments of Claude Bernard. 5. In larger doses, when insensibility is clearly established, death is always the consequence of continued respiration of the chloroform mixture. The larger the proportion of chloroform, the more rapid is death, and the less the fall of temperature. The experiments of M. Bert show that the method of administering chloroform is best and least dangerous by which the patient is quickly anæsthetized by a large quantity, and then kept under the anæsthetic by a much smaller amount.—*L'Union Méd.*, July 7, 1883.

Value of Hyoscyamine in Psychiatric Practice.

M. GNAUK has recently contributed a paper on this subject in which he speaks in high terms of hyoscyamine as an efficient remedy in psychiatric practice. Amorphous hyoscyamine contains a large amount of hyoseine. Hyoseine is hypnotic in doses of gr. $\frac{1}{30}$ to $\frac{1}{15}$, or $\frac{1}{32}$, subcutaneously, is hypnotic, but very toxic even in these small doses. Purified, colourless hyoscyamine is not constant in its effects, is uncertain, and sometimes toxic in doses of gr. $1\frac{1}{2}$. Crystallized, pure white hyoscyamine, in doses of gr. $\frac{1}{30}$ to $\frac{1}{32}$, subcutaneously, is more satisfactory, because, when completely pure, it can be given in quantities of known strength as a safe and efficient hypnotic, producing but little toxic effect, and, on account of its solubility, answers admirably for hypodermic use. Its most important action lies in the fact that it is hypnotic without being markedly toxic. It acts very rapidly and efficiently on insane patients as well as on others. Ten minutes after its administration, the pulse rises from 76 to 120 or 130, and then beats regularly. The narcotism may be complete, or simply manifested by lassitude, and the patient is calm though not analgesic. The sleep produced is long, lasting during the whole night. The best form for hypodermic administration is distilled water fʒvss, cherry laurel water fʒijss, hyoscyamine grs. iʒss; gr. $\frac{1}{2}$ of hyoscyamine equals grs. xxx of chloral, gr. $\frac{1}{3}$ of morphine, and grs. xlv of bromide of potassium. Gnauk has seen gr. $\frac{1}{3}$ of hyoscyamine act as efficiently in rebellious cases as gr. $1\frac{1}{2}$ of morphine. In agitated cases gr. $\frac{1}{2}$ should be used at once; with more tranquil cases one may commence with gr. $\frac{1}{4}$, increasing, if necessary, to gr. $\frac{1}{2}$ or ss. The prodromata of intoxication are increase of delirium, special hallucinations (such as seeing large animals), and great dilatation of the pupil. When the pupil is not affected the drug has not had the proper effect. A gradual effect may be attained by repeated small doses; but when the calming effect is desired a large dose should be given at once; and when repeated small doses have not the desired effect, a larger dose should be given at one time. This procedure is perfectly compatible with a continued treatment of three or four weeks. This prolonged administration is necessary in chronic cases with accessions of violent agitation. In some cases collapse may occur, but is not dangerous to life, and is easily avoided by regarding the thirst, buccal dryness, heaviness of the head, faintness, diplopia, and, in some cases, increased agitation, showing individual idiosyncrasy. Morphia is an excellent antidote. The best preparations of it are Merck's alkaloids.—*Archives de Neurologie*, July, 1883.

Acetal and Paraldehyde; their Hypnotic and Analgesic Properties.

Diethylacetal, belonging to the acetal family, and commonly called by that name, has been recently recommended by VON MERING as an excellent substitute for chloral. It has a bitter taste, slightly burning, soluble in eighteen times its volume of water, and soluble in alcohol in all proportions. The experiments of von Mering made on frogs and mammals have led him to conclude that acetal and diethylacetal particularly act on the nerve centres by suspending their functions, commencing in the cerebrum and extending to the cerebellum and cord; in toxic doses they arrest respiration, and later the heart. Von Mering has used acetal on eight patients. Six slept during the whole day after taking ʒijss–ʒiij; the other two, one of whom had a fracture of both calcanei, the other subject to ataxic fulgurant pains, after taking acetal felt drowsy, and noticed a marked diminution of pain. None of the eight patients complained of any disagreeable sensations after the hypnotic effect had passed off. As acetal is less

caustic than chloral, Von Mering recommends that it be substituted for that drug in ulcerative affections of the digestive canal. It may be given in the following mixture: diethylacetal, $\mathfrak{z}\text{ij}$, suspended in $\mathfrak{f}\mathfrak{ss}$ of gum acacia, and $\mathfrak{f}\mathfrak{v}\mathfrak{j}$ of orange flower water.

The observations published by STOLTENHOFF agree with the conclusions drawn by von Mering. Stoltenhoff reports the case of an old woman, demented for five months, very much agitated and suffering with persistent insomnia; opium had given no relief. He gave grs. xlv of acetal and she slept a large part of the night. On the next day $\mathfrak{z}\mathfrak{j}$ was given; she slept through the whole night and was calm during the next day. This good effect was maintained up to the time at which the case was reported, the woman having taken over $\mathfrak{z}\mathfrak{x}$ of acetal. In two other patients of this class, one affected with general paralysis, a daily dose of $\mathfrak{z}\mathfrak{j}\frac{1}{4}$ produced a calm condition and sleep. In a case of acute mania, a robust man, who was incessantly excited, a dose of $\mathfrak{z}\mathfrak{j}$ gave a quiet night. The sedative and hypnotic effects were apparent in 5–30 minutes after the drug was administered, and lasted from 4–10 hours.

The observations of BERGER, of Breslau, on three insane persons were not so favourable: $\mathfrak{z}\mathfrak{i}\mathfrak{j}\mathfrak{ss}$ of acetal gave one and a half hour's sleep to one patient; in four other cases the effect lasted 20 or 30 minutes, and in eight others there was no effect at all. Berger has seen it cause vomiting in one case, redness of the face in two others; two complained of a heavy feeling in the head and a kind of inebriety which lasted for several hours. To one patient he gave $\mathfrak{z}\mathfrak{j}\mathfrak{vss}$ of acetal, and he slept an hour and a half. Leyden, of Berlin, had still less satisfactory results with acetal.

Paraldehyde seems to be a much more satisfactory drug. It is isomeric with aldehyde, and though its hypnotic properties are less energetic than those of chloral, it may be given in larger doses and with no influence on the heart or intravascular pressure. Of this fact Cervello has been convinced by his experiments on dogs and rabbits. A man suffering with sciatica took, in three doses, $\mathfrak{z}\mathfrak{i}\mathfrak{j}$ of paraldehyde, in aqueous solution, in one hour and a half. Two hours after the last dose, the patient was sleeping calmly, and continued to sleep for more than ten hours. Cervello thinks that paraldehyde acts much more promptly on females, and that, generally speaking, the dose must be three times as great as that of chloral.

Berger has made eighty clinical experiments with paraldehyde in his hospital service, and twenty others among his *clientèle*. In twenty cases the drug was given in the evening, and during the day in sixty cases. The doses varied from grs. xv to $\mathfrak{z}\mathfrak{i}\mathfrak{j}\mathfrak{ss}$. It was given suspended in sweetened mucilage of acacia with syrup of bitter orange-peel. Among the eighty experiments made in the hospital, sound sleep, of several hours' duration, was produced in nineteen cases: in forty-two, the sleep was not so long (one hour, one and a half hour, and three hours); in nineteen cases there was no soporific effect. The dose, in the favourable cases, varied from grs. xxx– $\mathfrak{z}\mathfrak{j}$; sleep came on in ten to twenty minutes after the medicine was taken. When the desired effect was not produced by $\mathfrak{z}\mathfrak{j}$, an increase to $\mathfrak{z}\mathfrak{i}\mathfrak{ss}$, or even $\mathfrak{z}\mathfrak{i}\mathfrak{j}\mathfrak{ss}$, rarely gave a better result; on the contrary, nausea and vomiting would come on, with cephalalgia. There were never any excitant phenomena. In his private practice doses of grs. xxx– $\mathfrak{z}\mathfrak{j}$ gave the desired results in twelve out of twenty cases. Berger concludes that this drug will be of service when chloral is insufficient or when there is a cardiac complication.—*Gaz. Méd. de Paris*, No. 28, 1883.

Resorcin in Hyperpyrexia, Intermittent Fever, Anthrax, and Erysipelas.

Resorein, which has been called "poor man's quinine," is attaining a useful position in therapeutics. In Dr. Braun's clinic (*Wien. med. Presse.* i. 1883) it has been used in over 300 cases of child-bed fever, in all cases where the pyrexia attained a certain grade, and almost invariably it produced a marked reduction of temperature, generally to the normal, rarely below, which usually was accompanied by more or less sweating. In some cases this was profuse. The temperature after its reduction seldom remained low longer than a few hours, so that the dose had to be repeated in the evening when a high morning temperature had required its use earlier. The usual dose was grs. xlv., which sometimes had to be repeated. In cases where such large doses cause nervous symptoms, smaller ones are advised to be given and frequently repeated.

In intermittent fever resorein has a position not far below quinine, although the dose is larger. Ugo Bassi (*Gaz. Med. Ital. Prov. Venet.* 1883) reports its use in twenty cases, which were all cured except three. In one case the attacks were relieved by the remedy, but it did not prevent recurrences; this happens also with quinine. In all the remaining cases the cure was permanent, the patients being instructed to avoid fresh malarial poisoning. It required only two or three doses (grs. xxx-xlv.) simply dissolved in water to effect the cure. Larger doses are not necessary. The great advantage of resorein over quinine is its cheapness.

Dr. Skibnevsky (*Medizinskoje Obosrenije*, December, 1882) reports two cases of erysipelas in which subcutaneous injections of a five-per-cent. solution caused a rapid disappearance of the symptoms. From ten to twenty injections were made at one time into the affected area, and in each case they had to be repeated only once. It is worthy of notice that, in both cases, within about two hours after the injection not only did the fever disappear, but the temperature fell even below the normal.

Although resorein in any form is not absorbed by the healthy unbroken skin, the contrary is the case when there is any morbid action on the skin, as in lepra, rupia, variola, scarlatina, or erysipelas, in which it both stains the skin and discolours the urine. In cases of parasitic disease of the skin its use has been attended by remarkable success. Dr. Justus Andeer has reported a case (*Aerztlich. med. Blatt*, 1883) of carbuncle in which bacilli were detected, and a guinea-pig being inoculated with the pus died of septicæmia. Other remedies had been used locally without much result, when a fifty-per-cent. resorein-vaseline salve was applied rather freely upon the pustular erysipelatous surface of the forearm, covered by a gauze bandage. A good diet was given. After this the pain and tension diminished, the surface rapidly assumed a more healthy appearance, and the eruption soon healed. The reporter declares that resorein, whether in strong or weak solution, is entirely free from irritation, and never produces any eruption, and is, therefore, to be preferred to all aromatic disinfectants. It is best used in the form of salve. It is completely innocuous to the skin, and causes neither hæmoglobinuria like naphthol, nor toxic symptoms similar to those caused by carbolic acid, pyrogallie acid, etc. He does not approve of subcutaneous injections of the remedy.—*Practitioner*, July, 1883.

MEDICINE.

Hæmoglobinæmia.

Prof. PONFICK has recently published an article in the *Berliner Klinische Wochenschrift*, No. 26, on hæmoglobinæmia and its consequences. It is known that many agencies have the property of displacing the hæmoglobin from the red blood-disks, so that the colouring matter is discharged into the blood-plasma. The transfusion of foreign blood, *i. e.*, blood from a donor of different species to the receiver, burns of the surface of the body, and many chemical substances (pyrogallie acid, arseniuretted hydrogen, potassic chloride, etc.), possess this property. Peculiar as is the bond of connection between the stroma of the red blood-disk and its hæmoglobin, yet the union is very easily dissolved. In fact, to prepare hæmoglobin from the dog's blood, it is sufficient to add ether, and keep in a cool place, then filter the red mass of crystals thus formed, redissolve in water, and recrystallize. From what has been said, there will be no difficulty in comprehending the full meaning of the term hæmoglobinæmia. The notions which Ponfick has on the subject may be enumerated in the following fashion. There are different degrees of hæmoglobinæmia. When this state exists the altered products (of the blood) are disposed of in three directions. The spleen is enlarged with the fragments resulting from the destruction of the blood—that is one direction. The liver secretes an excessive quantity of bile (hypercholia); and lastly, the *débris* of the decomposition of the blood (implied in the setting free into the blood-plasma of the hæmoglobin) is excreted by the kidneys. With limited hæmoglobinæmia there is neither hæmoglobinuria nor icterus. When the hæmoglobinæmia is greater in degree, some of the colouring matter of the blood appears in the urine, and there are signs of slight and transient jaundice. Profound destruction of the red blood-elements is followed almost instantaneously by intense and prolonged hæmoglobinuria (associated with exudative nephritis) as well as marked and severe icterus.

Much food for reflection is offered in these scientific speculations by Ponfick. The views promulgated may help to throw light on many morbid phenomena. Good grounds certainly exist for the opinion that the spleen and possibly other organs are concerned in the destruction of the red blood-disk. A further consideration is the fact that the blood is constantly being destroyed and renewed. Now, if there be constantly going on a dissolution of the red blood-elements, it follows that at least a local hæmoglobinæmia always exists; unless, indeed, we regard the dissolution as always occurring in the solid elements of the tissues concerned. Some physiologists teach that the hæmoglobin thus set free is converted, probably by the hepatic tissue, into bilirubin, the principal colour-constituent of the bile. There is much plausibility in such a view. Indeed, it is very probable that hæmoglobin is the source of all the pigments of the body. Granting these considerations, we may conceive how, step by step, an increase in the degree of hæmoglobinæmia may entail all the consequences which Ponfick has claimed for this excessive destruction of the red blood-disks in the blood circulation. The importance of these plausible conjectures in connection with the explanation of the occurrence of hæmatinuria and jaundice, which have been so often observed in malignant and septic fevers, is obvious. Again, hæmatinuria has been met with in purpura and scurvy, also after poisoning by arseniuretted hydrogen or carbonic anhydride, and as a distinct affection, named paroxysmal or intermittent hæmatinuria. The relations which have been observed to subsist between ague, oxaluria, rheumatism, and this intermittent hæmatinuria are well worth remembering at this time. If the enlargement of the spleen in ague coincide with the

excessive production of hæmoglobinæmia we might expect some corresponding evidence of the excessive production of blood-pigment. It would perhaps require no great ingenuity of argument to harmonize these considerations with the facts observed in acute and chronic malarial poisoning. Hæmoglobinæmia may be looked upon also as the precursor of icterus in the form which has been known as "hæmatogenous" jaundice. The actual coexistence of hæmoglobinuria and icterus is spoken of by Ponfiek, and he believes that the hæmoglobin passes over unchanged in the urine when the liver is incapable of converting it into bilirubin, the power which the liver has in this direction being limited.—*Med. Times and Gazette*, August 18, 1883.

Renal Form of Typhoid Fever.

Dr. DIDION, who chose this subject for an inaugural dissertation, comes to the following conclusions. Typhoid fever produces a renal congestion, which plays an important part in the course of the disease. Albuminuria is almost constant, but generally slight and temporary; when abundant, it is a sign of true nephritis. The renal inflammation is both parenchymatous and interstitial, and produces certain characteristic symptoms, such as asthenia, stupor, dryness of tongue, œdema of the face and legs, lumbar pains, cutaneous eruptions (pemphigus, cethyma, boils), and an alteration in the urine, which has a reddish colour and the odour of boiled bread; in the deposit, red and white blood-corpuscles are found, as well as casts; the urine contains a large quantity of albumen. The diagnosis can easily be arrived at by the above-mentioned symptoms. The termination is often fatal, either from asthenia or uræmia.

As to the treatment, Bouchard recommends carbolic acid and the salicylates, Polli the sulphites, Klebs the benzoate of potash. Leeches, mustard poultices, and cupping in the lumbar region, are useful; but blisters, even with the addition of camphor, must be avoided. In certain cases, the disappearance of the symptoms is accompanied by abundant diuresis, which ought, therefore, to be favoured if possible; but all diuretics are not equally good, those which possess irritating properties must be avoided. The best in these cases is milk, pure or mixed with water. Whatever may be the way in which it acts on the kidneys, it is always well borne, and its action is double; it increases the secretion of urine, and hastens the elimination of toxic principles, without producing any irritation, even in the most acutely inflamed kidney. Subcutaneous injection of pilocarpine might perhaps be useful; in one case, when the skin was dry and burning hot, Dr. Didion injected twice daily one-sixth of a grain of pilocarpine, and under its influence the skin became moist and abundant sweat was produced; the tongue also was less dry than before; the temperature fell in two days from 105.8° to 98.6° F.; but three days later the patient died, after the temperature had once again reached 104° F. New investigations are necessary before we can arrive at definite conclusions. As for the cold baths, Gubler thinks that they are contraindicated in case of nephritis, but Libermann considers their use as surely beneficial in spite of it. Several patients who had been subjected to that treatment did not complain of any inconvenience, and cold lotions rapidly applied to the trunk and limbs with a sponge seem to relieve the patient, lower the temperature, and re-establish the functions of the skin. All these advantages must be weighed against the danger of a renal congestion; but further experience alone can show which treatment is most advantageous.—*British Med. Journ.*, July 7, 1883.

Treatment of Cholera.

Dr. B. WARD RICHARDSON concludes a series of papers on the Treatment of Cholera during the First Stage and during the Fever of Reaction, as follows:—

In cases where it is clearly shown that the symptoms have followed indulgence in any kind of food or fruit that has created stomacheic or intestinal derangement, I have found it good practice always to administer a dose of castor oil, and, if necessary, to repeat the dose. After Dr. George Johnson's essay on administration of castor oil I was bolder than before as to this plan, and, I think, with favourable results. So soon as the oil has acted by the bowels—for, singularly enough, it rarely excites vomiting—I have given in every case a mixture containing creasote, opium, and camphor. The following is a good form: Pure creasote, ℥xij; compound tincture of camphor, ℥ss; pure glycerine, ℥ss; distilled water, ℥ss—to make a mixture of twelve doses, of which one fluidrachm in a wineglassful of water may be taken every hour until the vomitings and the discharges from the bowels are relieved.

Creasote in small repeated doses, in combination with opium and camphor, as formulated above, checks the choleraic discharge, relieves the spasm, and is the most demonstrably curative of any remedy I have known.

Treatment in the Stage of Reaction.—I doubt if there be any stage of cholera in which more careful treatment is demanded than the stage of reaction. One is very apt to be deceived by the transition from the cold stage of collapse to the stage of fever. At first all seems well. The cold extremities become warm; the cold breath, so characteristic of cholera that it would yield a diagnosis almost of itself to those who have seen cholera, is again natural; the cramps have ceased; the mind of the patient is easy; the anxious, shrunken expression has departed; the voice has lost its bleating sadness; everything bids fair for recovery. An hour or two passes, and all is changed; there is intense fever, dry skin, parched tongue, nausea, often deliriums and too often a second collapse, assuming what was once commonly called the typhoid type.

The reaction is as close as it can be to that which succeeds exposure to extreme cold or starvation, and the treatment required to meet it is practically the same.

When the stage of collapse has decidedly passed away, the safest practice is to prevent every artificial means of stimulation. Hot drinks, rich foods, alcoholic stimulants, over-clothing, over-heating of the air of the room, are all to be specially avoided. The patient may continue to drink cool watery fluids, he may be allowed watery fruits like melon, but he must not be rapidly fed. He may be relieved of medicine. He must be allowed to rest and sleep.

If, in spite of all precautions, the febrile state does occur, and if the pyrexia runs high, the plan is to combine the application of the cold band to the cervical region and to the head, with administration of cool drinks in abundance, and continued absolute rest.

Medicinally, ammonia, largely diluted with water and milk, is the agent most likely to retain the fluidity of the blood and prevent septic change. Or ammonia might be exhibited by inhalation in the form of ammoniated chloroform, after the manner I have recently suggested for the reduction of zymotic pyrexia.—*Med. Times and Gaz.*, Aug. 25, 1883.

Diabetes in Children.

SENATOR, in speaking of the pathological appearances of diabetes occurring in children, remarks that the opportunities for observing them are few in number not only because the disease rarely causes death, but also because the patients, on

account of the long course of the disease, seldom remain in the hospital. The most frequent changes are found in the brain; inflammatory and degenerative conditions of the fourth ventricle often occur, also tumours in that situation or in the cerebellum; these tumours are tubercular or gliosarcomata; there are also in some cases syphilitic exostoses of the skull, together with gummata of the liver. Prof. E. Hagenbach reports the following case: A girl four and a third years old, and previously healthy, began in the winter of 1879 and 1880 to be very fretful, to drink a great deal of water, and to lose her appetite; soon after she would not take anything but milk and water, and cried out for it in her sleep at night. The renal secretion was very large in amount, and there was decided emaciation. There was no history of injury; the parents were living and healthy, and there were three other healthy children. Hagenbach first saw the child December 23, 1880, after she had been in this condition for a year; she was pale and feverish, very restless and irritable. Nothing abnormal was discovered on examination of the chest. She drank a great deal of water. The specific gravity of the urine was 1004; no albumen; no sugar. December 24th she vomited. December 25th she complained of headache. December 27th there was sudden loss of consciousness, with stiffening of the limbs and a quick pulse. On the following day there was converging strabismus, twitching of the right arm and leg, and the right side of the face, and great somnolence. January 2d the pupils were dilated and not reacting, the right pupil being narrower than the left. January 6th death took place without convulsions. The patient passed immense quantities of urine, which it was impossible to measure accurately, during the latter part of her life; the specific gravity varied between 1000 and 1004, and there was no sugar found at any time, although repeated examinations were made. The post-mortem showed the principal changes to be cheesy tubercle of the infundibulum; meningeal tubercle and distension of the fourth ventricle and the lateral ventricles; tubercular peribronchitis at both apices, with a few fresh miliary tubercles of the left lung; follicular ulceration of the large intestine; interstitial hepatitis; hemorrhages in the kidney, and hemorrhagic erosions in the stomach and duodenum.—*Boston Med. and Surg. Journ.*, July 26, 1883.

Melituria after Scarlatina.

Dr. ZINN, of Bamberg, reports the following case: January 27th a boy, four years of age, previously strong and healthy, and of healthy parentage, was seized with scarlet fever and diphtheria. The eruption faded on the seventh day, and the diphtheria gradually subsided. On the thirteenth day an otitis externa appeared, and stormy vomiting with rapid development of œdema and ascites, the urine now for the first time showing evidence of nephritis, being lessened in quantity, and showing a large amount of albumen and numerous casts and blood corpuscles. In a few days the more dangerous symptoms passed off, the patient being treated with hot baths and injections of pilocarpine, and a diffuse diuresis having set in the œdema and ascites quickly disappeared. Although the appetite improved considerably the little patient's strength did not return, so that he remained in bed during the whole month of March. Early in April, on attempting to walk, he was found to have paralysis of the right leg, which, however, soon passed off under the administration of iron without electricity. At this time also a slight amount of albumen appeared in the urine. The next symptom which presented itself was increased action of the heart, even noticed by the child himself. On the 10th of April the urine had a specific gravity of 1030, and a considerable amount of sugar. The amount of urine passed in twenty-four hours decreased to between 750 and 1000 cubic centimetres. The appetite was good,

but not excessive; the thirst was not noticeably increased, and nothing else abnormal was discovered. The child was placed on an exclusively meat diet, with milk, eggs, and red wine, and by the end of April there was only one per cent. of sugar in the urine, and by the middle of May one-fourth per cent. From this time the child improved in strength, and was allowed to have a mixed diet, and by the middle of June the urine was free from both sugar and albumen, and the patient soon became as strong and well as ever.

This case is of unusual interest, both from the rarity of its occurrence as a sequela of scarlet fever and from its unusually favourable result. Kütz, in his article on diabetes mellitus in Gerhardt's *Handbuch der Kinderkrankheiten*, states that out of 111 cases of this disease only seven recovered. The same author mentions that the cause in two cases appeared to be measles, but no case is attributed to scarlet fever. Redon, in his collection of cases of diabetes,¹ gives, among other causes, weakness from previous diseases, such as measles, scarlet fever, typhoid, etc. Yet on looking over the original articles from which he gathers his cases scarlet fever in no instance is found to be a cause. Thomas, in Ziemssen's *Handbuch der Allgemeinen Pathologie*, Band i., s. 290, speaks of the appearance of sugar in the urine with cerebral symptoms occurring during the stage of fever in scarlet fever, but not as a sequela of that disease. In view of this case of Zinn's it would be well during a convalescence from scarlet fever to examine the urine carefully for sugar as well as albumen where the patient does not gain in general strength as fast as he ought to.—*Boston Med. and Surg. Journ.*, July 26, 1883.

Acetonuria and Diabetic Coma.

The termination of diabetes by acetonuria or acetone intoxication, if one may judge by recent statistics, seems to be much more frequent than is generally supposed. S. MACKENZIE has noted it 19 times in 37 cases of diabetes, and 26 times in 43 other cases observed in Guy's Hospital. From these facts he believes that he is justified in concluding that young diabetics frequently die in coma, the disease developing in these with a certain acuity, and the lungs being sound or invaded only by the lesions of commencing phthisis.

In a work on diabetic coma Frerichs reports no less than 25 cases coming under his own observation, of which he made detailed observations. He divided these into three groups: the first comprehending cases of diabetes with rapid death, the patients having died in a comatose state in a few hours after being seized, without prodromal symptoms, with general feebleness, failing pulse, and cold extremities. Some of the patients in this first group already had marasmus. In the second group the comatose state was preceded by prodromal symptoms, general feebleness, gastric symptoms, nausea, vomiting, and obstinate constipation, or by some local affection such as dental abscess, pharyngitis, phlegmon with tendency to gangrene, bronchitis, or broncho-pneumonia. Before falling into the somnolent and comatose state the patients have headache, agitation with delirium, great pain, sometimes true accessions of mania, and dyspnoea; at times they make deep inspirations and expirations; the pulse becomes rapid and feeble; the temperature descends below the physiological level. This state lasts from three to five days. In the third group Frerichs places the diabetic patients who, without the least dyspnoea or pain, with firm pulse and well preserved vital forces, are suddenly taken with headache, a kind of intoxication, and finally somnolence, coma, and death.

The numerous remedies which have been proposed against these accidents

¹ Virchow und Hirsch, Jahrb., 1877, Band ii.

seem to be equally inefficacious. Frerichs cites, among others, transfusion, the administration of oxygenated water, stimulants, weak solutions of phosphate and chloride of sodium, subcutaneous injections of ether, camphorated oil, antizymotics, carbolic acid, salicylic acid, etc. Of the causes of diabetic coma we are still ignorant; the alterations of the nerve centres, as offered in explanation by some, are not constant; others speak of thickening of the blood by an accumulation of sugar in it, a morphological and functional alteration of the red globules. This gratuitous hypothesis has led to dangerous therapeutic measures; others have attempted to unite diabetic coma and uræmia by ascribing the former to insufficient excretion of urine. Frerichs relates a case of uræmia in a diabetic which conclusively proves that there can be no possible assimilation between the intoxication of Bright's disease and that of diabetes which produces fatal coma. Ebstein has attributed diabetic coma to a retention of the excrementitious products of the blood, occasioned by a necrosis of the renal epithelium at the level of Henle's tubes. This lesion is too inconstant to explain the result. Frerichs has observed that in diabetics the epithelial cells of the tubules were constantly the seat of a hyaline degeneration, due to an accumulation of glycogen in the cells. The sole fact of its constancy in diabetics, who have succumbed to it matters not what complication of this degeneration, cannot be held to be the cause of the comatose condition.

Frerichs has never been able to discover traces of fat emboli in the pulmonary vessels of the glomeruli of the kidney, of the liver or brain, as has been suggested as a possible fact in the pathogenesis of diabetic coma. In fine, says Ricklin, it is commonly admitted to-day that acetone and diacetic ether, which for a long time have been considered as causes of diabetic intoxication and coma, have no part in its development; diacetic ether pre-exists neither in the urine nor in the blood, and both acetone and diacetic ether are frequently injected into the veins of animals in laboratories.

Jakseh has shown (*Zeitschr. f. Physiol. Chem.*, t. vi. 541, 1882) that acetone is a product of malassimilation which is found in the blood and urine in the normal state, and that it is increased in certain pathological states; he says that every febrile affection, from whatsoever cause, is accompanied by acetonuria; and that the quantity of acetone eliminated by the urine, which may reach five centigrams in twenty-four hours, is in direct proportion to the intensity of the fever. Jakseh has seen cases of diabetes in which only normal quantities of acetone were eliminated by the urine; other cases present a true acetonuria, the urine turning red when heated with perchloride of iron. In still others, advanced diabetics, this reaction coincided with the presence of a considerable quantity of acetone in the urine. Of this third class many patients succumb to diabetic coma. Jakseh has twice found pronounced acetonuria in young men suffering with gastric troubles, saburral tongue, anorexia, constipation alternating with diarrhœa, cephalalgia, slight tumefaction of the spleen without fever. In these cases the urine heated with perchloride of iron gave the red color. He has also found a large quantity of acetone in the urine of persons with hydrophobia, as well as in cases of cancer of the stomach, in a case of cancer of the œsophagus, and in one of cancer of the stomach and pancreas. In another case dying in a state precisely similar to diabetic coma, the autopsy showed cancer of the pylorus, with metastatic foci in a large number of organs. (Ueber Pathol. Acetonuria, *Zeits. für Klin. Med.*, t. v. fasc. iii. p. 346.)—*Gaz. Méd. de Paris*, July 7, 1883.

Resorcin in Whooping Cough.

In an interesting article, recently published, Dr. MONCORVO, Professor of Diseases of Children in the Polyclinic of Rio de Janeiro, strongly advocates the employment of resorcin in pertussis.

He considers the parasitic origin of pertussis as established, and believes that resorcin is the proper germicide. Indeed, its parasitic origin now scarcely admits of a doubt since Burger, of Bonn, published his conclusions, which were that: 1. The bacilli were only encountered in the sputum of patients affected with whooping-cough. 2. They appeared in such quantities in the sputum of these patients that their influence could not be doubted; and, 3. The intensity of the case was in direct proportion to the abundance of the *leptothrix buccalis*. The experiments and examinations of Dr. Moneorvo and Prof. Silva Araujo fully confirmed Burger's conclusions.

Having satisfied himself as to the origin of whooping-cough, Prof. Moneorvo concluded that the most effectual theurapeusis was a local application to the laryngeal mucous membrane, and in view of its non-irritating qualities, resorcin seemed to be peculiarly adapted in these cases. It should be used in an aqueous solution of one per cent. and applied to the epiglottis and larynx by means of a camel's-hair pencil well curved and suitable for introduction into the larynx. Contrary to what would be expected, the application is not irritating to the larynx, nor does it bring on a paroxysm of cough, except at the first one or two applications. The taste and odour, not being disagreeable, increase its value for this purpose. It is, as we know, harmless when given internally to very young children even in large doses. It is important that a pure article be used; pure resorcin is very white, and occurs in the form of crystalline needles of silvery brightness. Besides the fourteen cases reported in detail, he has successfully treated twenty other cases with it, some very obstinate and complicated by hereditary syphilis, intermittent fever, threatened hydrocephalus, etc. Of the fourteen cases of which detailed reports are given, many are interesting on account of the rapidity with which the application caused the disease to disappear; in eight cases, variously complicated by hereditary syphilis, intermittent fever, marasmus, diarrhoea, and pulmonary tuberculosis, the disease had entirely disappeared in six weeks. In fact, of these cases, only two remained uncured at the end of four weeks, some being completely cured in one and two weeks.

From these facts he feels justified in concluding:—

1. That whooping-cough, whose nature and genesis, up to a very recent period, have been variously interpreted, may now, on account of recent microscopical observations, be classed among the parasitic diseases.

2. That the disease appears to be due to the presence of micrococci, which multiply with great rapidity in the hyperglottic region of the larynx, infiltrating the epithelial cells, which cells appear to be the elective seat of their development.

3. That resorcine, applied directly to the laryngeal mucous membrane, caused, in every case in which it was employed, rapid decrease in the number of the paroxysms, marked decrease of their intensity, and recovery in a short time without the aid of other medication.—*União Médica*, March, April, and May, 1883.

Pathology of Bronchial Asthma.

Prof. RIEGEL, of Giessen, in approaching the consideration of the pathology of asthma, remarks that there are several distinct questions involved, which are still more or less imperfectly settled. The first of these questions manifestly is: Is there really such a function in the bronchial muscles as active contraction, sufficient to affect the calibre of the tubes and to modify the pressure of the air within the lungs? Very different have been the answers given to this question by different physiologists—for we must be careful to notice that this is but a matter of physiology, and not of clinical medicine. Prof. Riegel's results are entirely in

accordance with the accumulating evidence of the work of recent, as well as of some of the older and most distinguished, observers; namely, that irritation of the bronchial muscles does raise the pressure within the lungs, and that this irritation may be induced through the medium of the vagus. This point having been settled, the next question was whether stimulation of the vagus caused acute dilatation of the lungs, such as is seen in asthmatical seizures? And this question, also, Prof. Riegel was able to settle in the affirmative, the pulmonary area enlarging rapidly when the vagus was galvanized in the neck (in dogs), remaining large during the continuance of the stimulus, and slowly returning to its normal dimensions when the irritation was removed. Nothing could have been more easy, or, indeed, more natural, than to conclude after these two series of experiments that the pathology of bronchial asthma was practically settled; that this disorder is essentially a neurosis of the vagus, the dyspnoea due to bronchial spasm and the pulmonary dilatation being the direct results of irritation of the great nerve of respiration. Prof. Riegel was too cautious, however, to rush to this conclusion, and his next set of observations showed the wisdom of his hesitation; for they distinctly proved that whilst irritation of the vagus unquestionably produces the phenomena of asthma, *it does not do so by causing spasm of the bronchi*. No doubt, as has just been shown, spasm of the bronchi is a result of irritation of the vagus; but there is a much more important, because much greater or more extensive, cause at work than this.

The turning-point in the investigation was the discovery that irritation of the vagus causes the phenomena of asthma, not by acting peripherally—that is, through the branches to the bronchi—but by influencing the central extremity of the nerve, that is, the medulla, and so (reflexly) the muscles of respiration. When the *central* end of the divided vagus of the left side was faradized, and the other vagus cut, the same asthmatic phenomena were produced; the reflex, therefore, did not occur through the bronchial nerves, but the respiratory nerves to the diaphragm and intercostals. That this was the case was completely proved by section of the phrenics before irritation of the vagus, for the phenomena of asthma then were entirely absent. An altogether unexpected result was thus reached, namely, that asthmatical phenomena may be produced *reflexly* through the vagus, and that the principal portion of the effect is a sudden inspiratory depression of the diaphragm, followed by its continued tonic contraction. It would thus appear that the theory of asthma, which represents the disorder as essentially one of bronchial spasm, must be given up. There can be no doubt that irritation of the vagus does cause bronchial spasm and moderate dilatation of the lungs, but this effect has always been regarded as much too insignificant to account for the symptoms of the disorder as clinically observed; and now that it appears to have been satisfactorily proved that besides this peripheral effect there is a reflex effect of incomparably greater importance, there is no reason why the theory of bronchial spasm should be any longer maintained.

Two very obvious objections to the view first stated are anticipated by Prof. Riegel. Can it be possible, in the first place, that the diaphragm may remain so long in a state of contraction as to cause the protracted dyspnoea familiar in many cases of asthma? There is no evidence to the contrary; and in the course of these experiments on dogs the diaphragm was actually seen to remain in a condition of contraction for ten minutes without producing asphyxia. Besides, the same objection might apply to the muscles of the bronchi. Again, it is a clinical fact that whilst the inferior lung-border is low in an attack of asthma, it moves in respiration. Is this fact compatible with spasm of the diaphragm? As a matter of fact it is; whether the phrenic be directly or indirectly stimulated, and the diaphragm thrown into inspiratory spasm, the lung-border moves slightly in respiration.

Lastly, Prof. Riegel cautions us against coming to the hasty conclusion that we have now settled the pathology of bronchial asthma. Spasm of the diaphragm may explain some of the phenomena of the seizure, but it certainly will not explain all. For himself, he still holds that there may be vaso-motor disturbance and hyperæmia of the bronchi, along with spasm. Still, spasm there is, and the present investigation shows that it is chiefly a spasm of the diaphragm.—*Practitioner*, July, 1883.

Fatty Transformation of the Kidney.

MR. EDWIN RICKARDS, in an interesting paper in the *British Med. Journ.*, July 7, 1883, on this subject, says that in fatty transformation of the kidney, there is a replacement of renal tissue by true adipose tissue, the contour of the organ being, to a varying extent, preserved. The condition is a rare one, and the cases on record are few. It has not, as far as I am aware, been before portrayed, numerous and excellent as are the illustrations of the various morbid changes in the kidney by Bright and others.

Whatever be the source of the fat, there can be no doubt that it is not degenerated renal parenchyma, and it is equally certain that the fat does not stamp out renal tissue. It seems probable that the fat is developed to fill up space created by the breaking down and discharge of renal substance, and that the process is one of physiological compensation, an effort of nature to prevent a vacuum. The origin of the fat may be accounted for in three ways: 1, hypertrophy of the circumrenal fat, which pushes its way into the interior of the organ at its hilum; 2, hypertrophy of the fat, which normally is found in small amount in the interior of the organ between the apices of the pyramids; 3, absorption of fat by the cells forming the stroma of the organ.

Statistics go to show that fatty transformation of the kidney is frequently associated with renal calculus. Even in Dr. Whipple's case (*Pathological Society's Transactions*, vol. xix.), a calculus may have escaped from the kidney, and found its way out of the body through the wound in the thigh. It is reasonable to suppose the sequence of events in such cases to be renal calculus, suppuration, and discharge of renal parenchyma and its substitution by fat.

The condition under consideration, though a rare one, must not be left out of calculation by the nephrectomist.

CASE.—Alfred Rowen, aged 24, was admitted into the Birmingham General Hospital, February 16, 1883. He was a broad-built, well-nourished man. When seen at 10 A. M., he had extreme dyspnœa, sitting with his arms leaning on the arms of the chair. The *alæ nasi* and *innæscles* of extraordinary respiration were working; his face was covered with beads of perspiration, and a little dusky. He was operated on for stone twenty years ago. For many years, he had known that his kidneys were diseased, because he sometimes passed matter in the urine. Occasionally he wetted his bed. Three weeks ago, he passed blood in his water, and vomited blood; he only vomited on that one occasion; at that time, he commenced making a noise in his throat, especially when asleep at night, and so loud that it kept awake fellow-lodgers, and, in consequence, he had to sleep in a separate room. During the last fortnight, he had been off work, and a great deal in the house. He had been very drowsy, sleeping during the day in his chair for two or three hours at a time. He had frequently played cards; and, on many occasions, he had suddenly jumped up, and said: "I must leave off; I have got the cramps in my fingers and legs." The fingers and legs would be drawn during these cramps, which lasted about ten minutes at a time.

When examined in the ward, his breathing was very laboured. The dyspnœa was essentially inspiratory. The suprasternal notch, the lower intercostal spaces,

and epigastrium sank in during inspiration. Laryngeal stridor could be heard at the other end of the ward. He was unable to speak, but protruded his tongue when asked to do so. His pulse was 120; temperature 100° ; respiration 40. Nothing abnormal could be heard in connection with the heart. On rapidly examining the lungs, mucous crepitant *râles* were heard over both bases behind. Examination of the fauces showed nothing. His legs and feet were not œdematous. Two ounces of urine were obtained, which was found to be alkaline, and to contain albumen and a large amount of pus. He became more comatose, the dyspnœa greater, and the breathing more stridulous. At 1 P. M., tracheotomy was performed, apparently without pain, but without manifest relief. He died at 4 P. M. on the day of admission.

Post-mortem Examination.—The body was well-nourished. The larynx was purple and œdematous. The lungs were œdematous. The heart was normal. The brain was not examined. The other viscera, except the kidneys, were free from morbid change. Both kidneys were imbedded in fat. The left kidney, which was half as large again as normally, on section was found to be transformed into true adipose tissue. Its capsule was thin. At its hilum, there was a mass of tough, dense tissue, like cicatricial tissue, which extended to the centre of the organ, and in it was impacted a triangular calculus, the size of a tamarind stone; this mass was found to be composed of the obliterated pelvis and ureter, with bloodvessels mostly collapsed, and connective tissue. The adipose tissue was divided for the most part into pyramidal masses by paths of connective tissue, which radiated from the calculus. In this connective tissue ran large bloodvessels. The corpuscles of this tissue were proliferating, and absorbing fat. In two or three spots, near the periphery of the fatty mass, there were small patches of condensed tissue, which the microscope showed to be the remnants of atrophied renal tissue. The ureter remained as an impervious cord. In the right kidney, there were areas in various stages of degeneration; the secreting tissue was reduced to about one-third its normal amount, and this was intensely inflamed. There were circumscribed masses of patty-like matter, and several thick-walled empty sacs; in one sac was a smooth, round calculus, the size of a pea. The pelvis, which was thickened and dilated, contained a calculus, weighing half an ounce.

Adenoma of the Kidney.

According to a recent article by Drs. A. WEICHELBAUM and ROBERT W. GREENISH, adenoma of the kidney has hitherto received but little attention in works on pathological anatomy; but this is not due to the fact that it occurs unfrequently; on the contrary, although not a very common, it is not an uncommon affection.

Macroscopical Conditions.—As to its situation, adenoma seems to be equally often found in either kidney. It seems to occur generally in the neighbourhood of the upper or lower end, and most frequently in the cortical portion, and rarely in or near the pelvis of the kidney. Whenever it occurs in close proximity to the outer surface of the kidney the capsule is involved. As a rule, there is only one adenoma of a kidney, though two may be present, and cases have been found in which a number have occurred at the same time. It occurs in both kidneys at the same time in about 20 per cent. of all cases. The size of the growth may be as large as a walnut or hazel-nut, seldom so large as an egg, or so small as a millet-seed. Its consistence is usually the same as that of the normal kidney-substance, with the exception of those cases in which fibroid or fibrous metamorphosis has taken place, or when fatty degeneration occurs.

From an histological standpoint, adenomata of the kidney may be divided into two principal forms—the papillary, and the alveolar:—

Papillary Adenoma.—When papillary adenoma is completely developed, it is separated from its surroundings by a capsule more or less thick, and lying either in a single or several small cavities, the spaces being completely or partially separated from one another, and are filled with papillary growths. These grow out from one or more centres of the cavity wall, with a vascular network, sometimes abundant, and again deficient in round and spindle cells. When one or several growths are examined they somewhat resemble a tree. The walls of the cavity are lined with a layer of epithelium, the cells of which have various forms and sizes, though the cylindrical epithelium is the type most usually found. Not infrequently the epithelial cells have undergone a fatty degeneration, and in some cases pigment granules are also found. In every case in which the tumour has several cavities, there is found between them a fibrous web, or kidney substance. In the latter case the uriniferous tubules are easily seen variously compressed, or distended with colloid matter, whilst Malpighian capsules have undergone fibrous degeneration, or are transformed into colloid cysts. When more recent stages of papillary adenoma are observed, however; it is seen that it is not limited by the surrounding kidney substance. It is made up of numerous cavities containing gland lobules which increase from the periphery toward the centre; the cells bearing a striking resemblance to the epithelium of the collecting tubes of the cortex. The lobules lie so close together that there is scarcely room between them for a fine connective tissue stroma, though in some places there is quite a wide separation.

Alveolar Adenoma.—This is shown, as its name indicates, by an exquisite alveolar structure. The alveoli are of various sizes and shapes, the smallest being less than the cross-section of a convoluted tubule. They are round, oval, cylindrical or irregular in shape, and contain epithelial-like cells, or there may be a central fissure or a complete lumen. The cells have a peculiar character, being generally large, polyhedral or prismatic, or wedge-shaped, still free from retrograde metamorphosis, and lie in a homogeneous or granular protoplasm. Between the alveoli is a very sparse connective tissue stroma, which is structureless, or contains spindle-shaped cells, and in which the bloodvessels ramify. When the alveolar adenoma attains a certain size, like the papillary adenoma, it becomes invested by a capsule. Whilst both the papillary and alveolar adenomata have clearly defined forms and are easily recognized apart, during their genesis they so closely resemble each other that they can scarcely be distinguished.

Few tumours are so certain to undergo a retrograde metamorphosis as adenomata of the kidney, the metamorphoses taking place in the following order as to frequency: 1, fatty; 2, fibroid; 3, fibrous; 4, cavernous and pigment metamorphosis; 5, cystic degeneration; and 6, colloid degeneration with the formation of concretions in the stroma.

Differential Diagnosis.—The diagnosis between adenoma and carcinoma is most important. Alveolar adenoma may easily be confounded with carcinoma, as not only the alveolar structure, but the cells resemble those of a carcinomatous tumour, the adenoma cells being scarcely less polymorphous than cancer cells. But after an adenomatous tumour has attained a certain size it possesses a capsule, in which respect it differs from carcinoma. A careful microscopic examination, however, will decide the diagnosis.

From fibro-sarcoma of the kidney adenoma is diagnosed by the fact that fibro-sarcoma occurs in old age, and only in the medullary substance of the kidney, and by the well-known microscopic appearances of sarcoma. Adenoma is easily diagnosed from hæmatangioma cavernosa, and from cystic disease of the kidney by the macroscopic and microscopic appearances.—*Medizin. Jahrbücher*, 1883, Hft. ii.

The Nature of the Albuminuria of Bright's Disease.

SEMMOLA, of the University of Naples, has recently communicated the results of his last researches on this subject to the Academy of Medicine of Paris. It is now quite well established that the term "Bright's disease" is defective, and should only be considered as a general term under which different lesions of the kidney may be grouped, differing in seat and in the nature of their processes. Formerly the different lesions observed in the kidney were considered as the successive phases of the same disease; at present no one retains this idea. The name "Bright's disease" should be reserved for permanent, chronic albuminuria, for diffuse parenchymatous nephritis. What first produces the passage of albumen into the urine? Gubler, Jaccoud, and Semmola hold that the origin of the disease is in an altered state of the blood. Under some special influence the albumen of the blood is altered or increased, and then becomes capable of passing through the glomeruli. Others, as Dujardin-Beaumetz, hold at the same time to an alteration of the blood and some lesion of the kidney as the cause.

In his latest researches Semmola has endeavoured to show that the passage of albumen through the kidney presupposes no real lesion, but that this is a result; that the albumen of the various albuminuriæ cannot be distinguished chemically, whilst a high degree of diffusibility of albumen always denotes true Bright symptoms; that the bile of Bright subjects contains albumen; that the saliva and perspiration also contain it; and that the primary cause of the affection should be sought for in some alteration of the nutritive functions of the skin. He thinks that experimental facts fully justify this theory.

The experimenter has endeavoured to reproduce as nearly as possible the processes involved in Bright's disease. With this view he has suddenly introduced a large quantity of albumen into the blood, and has cautiously injected white of egg, in small quantities at first, into the subcutaneous tissue of dogs, which were kept under its influence for more than twenty days. He has kept dogs under its influence for thirty days, making daily injections of f5ijss to more than f5ij of white of egg. After four or five days the kidneys become congested, and if the quantity injected be large renal hemorrhage occurs. After seven or eight days leucocytes appear, and fatty degeneration of the epithelium sets in; and after fifteen days the kidney commences to get fatty. If the experiment is kept up, toward the twenty-fourth day the lesions of the kidney are almost identical with those of interstitial nephritis. The introduction of albumen into the blood causes an albuminuric dyscrasia, as shown by the fact that the quantity of albumen eliminated is greater than that injected. The bile becomes charged with albumen, and Semmola thinks that he is authorized in stating that he has realized artificially the natural morbid process. But the facts here show that the albuminuria is the primary, and the renal lesion the secondary lesion.

As to the primary cause of albuminuria, Semmola is convinced that it must be sought in some alteration of the nutritive functions of the skin.

In making the experiments he used different albuminous substances, as serum of blood, yolk of egg, and milk. With these the effects were different from those caused by white of egg injections. With blood serum the renal process was less rapid, and no functional alteration was caused by injections of yolk of egg and milk.—*Revue Méd. Franç. et Étrang.*, June 9, 1883.

Semmola has been convinced for three years, after a long experience, of the many imperfections in the chemical reactions for differentiating the different kinds of albumen. He has, therefore, turned his attention to the degrees of diffusibility of the albuminoids of the blood in the different albuminuriæ, and he is convinced that the great secret to be studied lies in the different gradations

of the albuminoids by reason of their diffusibility, or, in other words, their aptitude for performing their functions in the nutritive processes; and has arrived at the following conclusions:—

1. The albuminoids of the blood of Bright subjects are much more diffusible than the albuminoids of the blood in other kinds of albuminuria (mechanical albuminuria).

2. In Bright subjects of the first stage, and therefore curable, if the blood serum is examined before and after recovery, it is seen that the diffusibility of the blood albuminoids augments, diminishes or ceases in perfect relation with the quantity of albumen eliminated by the urine. Hence it is evident that the degree of diffusibility of the blood albuminoids constitutes the true point of departure of the albuminuria of Bright's disease.

3. This physico-molecular constitution of the blood albuminoids which characterizes their non-assimilability, and which consequently causes their forced elimination, is caused by a defect, greater or less, of the cutaneous functions. In support of this view Semmola brings forward a number of laboratory experiments and clinical observations which clearly prove the relation existing between the activity of the cutaneous functions and the alteration of the diffusibility of the blood albuminoids, or their degree of assimilability. He examines, by comparison, the degree of diffusibility of the blood albuminoids before and after varnishing the skin over a more or less extended portion, so that the animal may live a sufficient time. He has found that, all things being equal, the blood serum of these animals presents at least one-third of the principal albuminoid principles which become diffused if the varnishing occupies so much as one-half of the cutaneous surface. In these cases albuminuria is also seen, and the bile of these animals contains albumen in the proportion of three to five in one thousand.

As to the clinical observations, he has collected a series of cases of chronic eczema and psoriasis which alternated in their appearance on the skin with albuminuria, and which were finally cured by a long hydrosudopathic treatment. He relates one case of cutaneous seborrhœa in which the skin perfectly reproduced the experiment of the varnished dog. Water did not moisten it, and the patient was always cold; for a long time he felt the least breath of air, and became profoundly cachectic. He had albuminuria, and it was only after a long course of hydrosudopathy that he was completely cured; the albuminuria never reappeared.

Semmola thinks, therefore, that it is incontestable that the first stage of Bright's disease is constituted by a profound modification of the albuminoids of the blood which succeeds in proportion to the progressive enfeeblement of the respiratory functions of the skin, under the influence of cold and moisture, which are, in his opinion, the fundamental causes of true Bright's disease. This action of damp cold is very slow, and Bright subjects are already victims of the disease before they are aware of it. At this period there already exist the three characteristic symptoms of the disease in their order of sequence: 1. Increasing diffusibility of the principal blood albuminoids, and, consequently, increasing diminution of their assimilability. This chemical state he calls *etheralbuminuria*. 2. Diminution of the quantity of urea on the one hand, and, on the other, forced elimination of the albuminoids, by all the emunctories whose office is organic depuration, primarily the kidneys.

From these facts he was led to analyze the bile of Bright patients after death, and he found that the distinguishing feature of Bright albuminuria as compared with other albuminuriæ is, that on analyzing the bile *post-mortem*, albumen is found in the bile in the first case and not in the second. The sweat and saliva, artificially produced, present the same differences as regards the presence of

albumen. The final conclusion which he draws is of great interest because it is grouped with the differences already noted in the different albuminuriae. In the albuminuria of Bright's disease there is a loss of albumen which the organism produces through its different excretories in order to rid itself of the albuminoids which have already become non-assimilable; and in the other varieties of albuminuria (mechanical, nephritic, etc.) elimination of the albumen is due to a purely local cause which depends either on the degree of pressure of the renal circulation or upon epithelial alterations.

To demonstrate this theory, built upon laboratory experiments and clinical observation, one step remained—the experimental demonstration that the non-assimilable albuminoids (and therefore foreign to the organism) are capable of producing a renal process analogous to that of Bright nephritis by the fact that they can pass through the renal filter; this Semmola has demonstrated by a long series of delicate and conclusive experiments. He injected albumen into the areolar tissue, and rejected the common experiment of injecting white of egg directly into the blood, being convinced that albumen injections into the blood cause troubles too profound to obtain a complete resemblance to *etheralbuminuria* or to *etheralbuminosis* caused naturally. He injected variable quantities of white of egg—from $\frac{1}{3}$ v to $\frac{1}{2}$ jss daily—always keeping an accurate record of the weight of the animal in order to establish a constant relation between it and the amount of albumen injected. After the second day there gradually came on hyperæmia, sometimes simple, then accompanied by globular extravasation into the capsule, and even into the interior of the uriniferous tubules. The capsule was distended by an amorphous or granular material having the characteristics of albumen. Later, tumefaction appeared, migration of lymphoid cells, advanced fatty degeneration, epithelial necrosis, and even proliferation commencing in the areolar tissue in the animals which had for a long time resisted albuminous injections. In order to confirm these experiments they were repeated with other and less heterogeneous substances than white of egg—such as the yolk of egg, blood-serum, albumino-peptones, and milk.

Prof. Semmola does not think it necessary to give in detail the particulars of these comparative experiments; at present it suffices to say that the more the chemico-molecular constitution of the albumen approaches that of normal blood albumen, the less injurious will be its passage through the kidneys. Thus, injection of blood-serum into the subcutaneous areolar tissue is followed by albuminuria, but, other things being equal, it produces less slowly renal irritation, which is more feeble and transitory. He has observed, lastly, in dogs an albuminuria more or less developed in relation to the quantity of albuminoids injected, and more or less pronounced according to the degree of diffusibility of the albuminoids of the blood-serum. Anasarca never appears when small quantities are injected, although a minute quantity of albumen is eliminated by the kidneys. These facts also confirm, what Semmola has clearly shown, that the chemico-molecular constitution of the albuminoids of the living organism is of the greatest variability, and that a mere trifle, the simple passage through a living membrane, is capable of modifying them, and even rendering them non-assimilable, diffusible, in other words, and incapable of performing their functions in the work of nutrition.—*Progrès Méd.*, June 16, 1883.

Relation between Serum-Albumen and Globulin in Albuminuria.

This subject has been recently thoroughly investigated by Prof. F. A. HOFFMAN. He finds that ascitic fluid contains less albumen than the serum of blood. This is not extraordinary; albumen diffuses slowly through animal membranes,

and when we make experiments on dialysis of albuminous fluids the dialysate always contains less albumen than the original fluid. But curiously enough the proportion of globulin and of serum-albumen in the ascitic fluid is tolerably near that of the blood, whereas in ordinary dialysis globulin passes through more slowly and in less quantity than albumen. This shows that transudation in living tissues goes on in a different way from dialysis outside the body. In albuminuria the relation of globulin to albumen varies much, and varies greatly in the same individual at different times of the day. Improvement in the condition of the patient is always marked by a diminution in the proportion of globulin. This is generally associated, but not always, with a diminution in the total amount of albumen. The relative proportions of albumen and globulin do not depend upon histological changes in the kidney. All kinds of proportion may occur in each form of kidney disease, but the proportion is of great practical value, inasmuch as it depends upon the intensity of the morbid processes going on in the kidney. In two persons suffering from the same form of kidney disease, the condition of the one with the smaller proportion of globulin is better. The proportion of globulin to albumen in albuminuria is often many times less than in serum. This condition differs greatly from what occurs in ascitic fluid, and agrees with what occurs in artificial dialysis. We should expect that this condition would be best observed in cases of slight lesion of the glomeruli, but on the contrary it is found that in cases of congestion, where we might be apt to assume that the albumen transudes through the glomeruli, the relation of albumen to globulin is the same as in ascitic fluid. In acute and chronic nephritis the rule may be laid down that when the lesions are slight the relation of globulin to albumen agrees with that of ordinary diffusion through parchment paper, viz., that the albumen much exceeds the globulin. The greater the lesion, the more does the proportion resemble that in ascitic fluid, viz., the more nearly do the quantities of albumen and globulin become equal.—*Practitioner*, July, 1883.

Hæmato-Chyluria and Chyluria.

Though the hæmato-chyluria of tropical climates has long been known, it is only within the past fifteen years that its parasitic origin has been demonstrated. WUCHERER first described the parasite causing hæmato-chyluria from cases observed in Brazil in 1859. He found, in the urine of a woman, a microscopic worm with a very fine, tail-like appendage, a blunt head with a central point, and a transparent, granular-like body; its diameter was equal to that of a leucocyte, its length being sixty or seventy times as great. In 1870, CREVAUX observed, at Guadaloupe, a nematode worm 265 mm. long, and .01 mm. wide, having all the characteristics of Wucherer's parasite. It was very active, its progress was rapid, and its contortions energetic.

LEWIS found the embryos of this parasite in the urine of a score of chylurics in India, and in the blood a filaria to which he gave the name *filaria sanguinis hominis*. It was, then, established that hæmato-chyluria of tropical countries coincided with the presence of a particular nematode in the blood. Recent researches have confirmed this view. Mr. SPENCER COBBOLD has also found a parasite in a specimen of blood sent to him from Australia, and proposed to call it the *filaria Bancrofti*. It is certain, however, that Bancroft's description is that of a worm as thick as a hair, and three or four inches long; being altogether different from the parasite described by Wucherer and Crevaux. The *distoma hæmatobium* of Bilharz and Harley differs also from the filaria which Damaschins found in a Zanzibar negro. This man had intermittent attacks of milky urine containing fat in emulsion, fibrine, red and white blood globules. He was

an hæmato-chyluric. In his urine were found embryos analogous to those contained in the stomach of mosquitoes which had bitten hæmato-chyluric patients. He also discovered in his blood, but only at night, the true filaria of Wucherer and Crevaux. When the urine ceased to be chylous, the filariæ were not found in the blood.

Dr. Stephen Mackenzie has observed a remarkable case of which he subsequently made a post-mortem examination. A soldier, born at Madras, of European parentage, found, after arriving in England, that his urine was more abundant, turbid, slimy, and by degrees quite milky. Later he was seized with violent pain extending from the left loin to the testicle. The urine averaged 120 ounces per diem, sp. gr. about 1010, reaction neutral or faintly alkaline, no sugar, a little albumen. Urea 6 per cent. Ether readily removed the milky colour. The blood at night contained numerous filariæ, the maximum being reached at midnight. None were found during the day. By inverting the order of his life, sleeping during the day, and being awake at night, the filariæ attained their maximum at noon. Symptoms of pneumonia developed at the left apex, followed by abscesses at the root of the neck and left shoulder joint. These were opened; from this time the urine ceased to be milky, and the filariæ disappeared. The patient finally died of right empyema. The kidneys were slightly enlarged, and in the early stage of suppurative nephritis. The mucous membrane of the bladder was thickened, covered with mucus, and contained extravasations. The abdominal lymphatics were greatly dilated. The thoracic duct was dilated below and obliterated above. The lymphatics of the left kidney were dilated and contained calculi. No trace of the parent worm was found; nor any communication between the dilated lymphatics and the urinary passages. Hæmato-chyluria of tropical climates is endemic in Brazil, the Bourbon Islands, the Island of Mauritius, in India, Australia, and other places. Its course is more or less irregular, during which the urine is sometimes sanguinolent, sometimes milky.

Chyluria may last for several years without gravely compromising the health. Crevaux cured a case by administering copaiba, and Wortabet has cured the hæmaturia, as seen in Egypt, by spirits of turpentine. The balsams seem to be indicated. Sometimes the disease is cured spontaneously, or under the influence of an acute intercurrent disease. No reason can be assigned for the fact that the filariæ only appear in the blood during the night.

All cases of chyluria are not parasitic. Gubler has described cases of oily urine, and Robin thinks that the chyluria of our climate is only an exaggeration of what Gubler describes. It differs from hæmato-chyluria by the absence of filariæ and hæmaturia.—*Progrès Méd.*, July 14, 1883.

Treatment of Leprosy.

The treatment which SURGEON-MAJOR PETERS has adopted at the Leper Asylum at Belgaum, during the last two years, consists, he says, of: 1. *Local applications.*—The patient was made to rub carbolic acid and sweet oil (1 in 40), early in the morning for a couple of hours, all over the body, and then bathe at about 9 A.M. with soap and warm water; afterwards to rub in an emulsion of gurjon oil made according to Dr. Dongall's formula (viz., gurjon oil 1 part, lime-water 3 parts, churned well together so as to form a thin ointment of a creamy consistence) over the affected parts, and fill in the ulcerations with cotton-wool smeared with the emulsion.

The ulcers healed rapidly, even such as had remained open for several years, but the anæsthetic parts and tubercles remained much the same; and except in one or two instances, where it was alleged by the patients that the tubercles were

softening, I noticed no change in them. This induced me to try the cashew-nut oil, which has been so successful in the hands of Dr. Beaupertuy. The result of my trial was so satisfactory, that some of the oldest patients, who had no hope of being ever relieved in the slightest degree, took to it kindly in spite of the pain and discomfort arising from the blisters which the application of the oil over extensive surfaces gave rise to; and on seeing that they were benefited, they sent for their friends not in the asylum and placed them under treatment.

Briefly, then, I have used *externally* :—

1. As a general application, carbolated oil (1 in 40) rubbed over the whole body, to promote healthy action of the skin, followed by soap and warm water ablution.

2. For ulcerated parts, an emulsion of gurjon oil and lime-water (1 in 3), applied by means of cotton-wool and bandages as well as by friction.

3. For anæsthetic parts and tubercular growths, the application of cashew-nut oil.

Internally, chaulmogra oil in 5-minim doses, in combination with bicarbonate of soda 5 grains and peppermint-water 1 fluidounce.

For a time I used gurjon oil both externally and internally, as recommended by Dr. Dougall; but I was obliged to give up its internal administration in consequence of its ill effects upon the digestive system. In some cases it aggravated the symptoms of indigestion, which is invariably present in leprosy subjects, whilst in others it gave rise to diarrhœa, and I did not consider it desirable to weaken the strength of the patients by continuing its administration when we have a much better remedy in chaulmogra oil, especially as the weaker patients were liable to attacks of diarrhœa and dysentery.

As an *external* application, however, gurjon oil is very valuable in the treatment of chronic leprosy ulcers, which heal rapidly under its action, and I do not remember seeing in any single instance the cicatrices open out when it has been discontinued, although fresh ulcers may break out in other parts of the limbs, which are similarly healed under its use; and as a proof of its efficacy, it may be stated that the patients always asked for more of this emulsion than the quantity they were allowed.

Gurjon oil is, besides, a cheap article of commerce. The advantages of gurjon oil, then, are the following :—

1. Its rapidly healing action in chronic leprosy ulcers.
2. It softens the skin, and preserves the newly-formed cicatrices from cracking.
3. It prevents the collection of flies.
4. Its efficacy in the treatment of chronic skin diseases.
5. Its cheapness.

In the *cashew-nut oil* we have a potent remedy for the dispersion of tubercles. The oil is applied daily over the tubercles until blisters are formed, when it is discontinued. This causes the tubercles to soften and disappear, discharging in some cases an ichorous matter, and leaving an open ulcer. To the ulcerated surface thus formed the gurjon oil emulsion is applied, under which it cicatrizes rapidly.

The application of the cashew-nut oil has to be repeated again when the skin has healed until complete absorption of the tubercle has taken place. Care should be taken not to let it run over the healthy skin or into the eyes.

The cashew-nut oil appears to be beneficial, also, in the anæsthetic form, applied in a similar way over the surface covered with the anæsthetic patches.

Chaulmogra oil, as an internal remedy, acts as an alterative and stimulant tonic. Given in combination with carbonate of soda and peppermint-water, it relieves in the first instance the distressing burning sensation in the stomach arising

ing from dyspepsia, and the constant morbid craving for food which lepers generally complain of; at the same time it improves the appetite and promotes digestion, and thus leads to the healthy assimilation of food. Some of the patients who have been in the habit of taking alcoholic stimulants have asserted that they experienced a similar effect from its use; and for these reasons, combined with its not unpleasant taste, they preferred it to gurjon oil. Chaulmogra oil, moreover, has been found to have a direct influence in causing absorption of the tubercles, as seen in cases where cashew-nut oil had not been applied, and, therefore, particularly adapted in the treatment of leprosy.

He has used carbolic acid in combination with sweet oil made from ground nuts, sesamum seeds, and the seeds of the *Perbesina sativa*, or cocon-nut oil, in the proportion of 1 part of the acid to 20 or 40 parts of the oil, as a general application to promote healthy action of the skin, and also as a substitute for gurjon oil when he has not had a supply of the latter; but it is more expensive and less efficacious than gurjon oil in healing leprosy ulcers.

Iodide of potassium, he has also used with advantage, especially in cases associated with a syphilitic taint; and he believes it promotes the absorption of the exudation which causes the tubercles.

Diet.—The patients in the asylum received rice and dāl (pulse) as their principal meal; mutton once a week, and occasionally fresh fish. Potatoes and some of the ordinary country beans and vegetables were also allowed, which they cultivated themselves in the asylum grounds; but brinjals (*Solanum Melonghana*) and pumpkins, as well as salt fish or meat, were entirely forbidden.—*Edinb. Med. Journ.*, March, 1883.

Value of Arsenic in Certain Forms of Anæmia.

A very interesting communication, "On the Arsenical Treatment of Leukæmia, Pseudo-Leukæmia, and Progressive Pernicious Anæmia, with some Remarks on the Mutual Relation of these Diseases," is given by Dr. F. W. WARFVINGE, of Stockholm, in a recent number of the *Nordiskt Medicinskt Arkiv*. It appears that in the space of little more than four years since the Hospital of Sabbatsberg, in Stockholm, has been open, there have been under treatment in that institution no less than eleven cases of progressive pernicious anæmia, and the same number of pseudo-leukæmia, but only two of leukæmia, thus showing that the two former diseases are relatively common in Stockholm, and that they are much more common than leukæmia. The two cases of leukæmia, seven cases of pseudo-leukæmia, and seven of progressive pernicious anæmia were treated with arsenic by Dr. Warfvinge with the following results. One of the cases of leukæmia was of a slightly advanced lymphatic form, and the patient was able to leave the hospital after an arsenical treatment of three months' duration (internally and by injection). He presented all the appearances of perfect cure: the lymphatic glands had returned to their normal dimensions, and the number of white globules was reduced to the ordinary proportion. The other case was of a very advanced splenic form, with an enormous spleen, and the number of white globules was equal to the red ones. The spleen was considerably reduced in size under an arsenical treatment of twelve weeks' duration, the number of white globules was reduced to the proportion of one to ten, and the general health improved at the same time. But the cure was slow, and was only a little advanced when the patient, a feeble girl, sixteen years old, wished to return home. A few injections of Fowler's solution, made in the spleen towards the end of the treatment, were perfectly innocuous.

In the cases of pseudo-leukæmia, the arsenical treatment, which lasted only a

few days, was nearly ineffectual in two instances, one of the patients not wishing to remain in the hospital, and the diagnosis in the other being made only a few days before death. In the remaining five cases the result was more favourable. In one of them, in which iodide of iron had been ineffectually administered, and the cachexia and marasmus had reached an extreme degree, the arsenical treatment for five weeks produced a remarkable, progressive improvement. At the end of this time the patient presented the appearance of excellent health, had a voracious appetite, very good muscular strength, the spleen was normal, and there were only insignificant remains of hypertrophy of the glands, and, besides, the number of red corpuscles had increased. Unfortunately, six months after the patient had gone home from the hospital into the country, where he lived, he had a relapse which ended in death. In another case the arsenic also produced a remarkable effect on the hypertrophy of the glands. This was particularly the case after arsenical injections into the glandular parenchyma, the effect of which was very striking, the diminution of the swellings being rapid and considerable, but confined to the glands which were injected. The patient, who suffered all the time from asthma, had occasionally severe attacks of suffocation, and died in one of them, caused, as was shown at the autopsy, by the pressure of the mediastinal glands, which were much swollen and had not undergone reduction like those which were reached by the injections. In two other less severe cases of lymphatic pseudo-leukæmia the beneficial effect of the arsenic was unquestionable; the use of this remedy for from three to five months produced a slow diminution of the swellings, and such a decided amelioration of the general health that the patients on their discharge from the hospital appeared perfectly well. In the fifth case, a lymphatic pseudo-leukæmia with marked hypertrophy of the glands of the neck and mediastinum together with general prostration, the internal use of arsenic reduced the glandular swellings and brought about a satisfactory general condition, which has lasted for a year.

Of the cases of pernicious progressive anæmia, one rapidly became worse for a week during which iron was administered: the anæmia and cachexia had decidedly increased, and the number of red corpuscles had diminished; but after the employment of arsenic there was uninterrupted improvement, which was so well marked that at the end of two months the patient, being regarded as cured, ceased to take the arsenic, but on the next day after its discontinuance he was attacked with violent acute nephritis terminating in death. The autopsy proved the total absence of the ordinary signs of pernicious anæmia. In another case the patient came to the hospital almost in a dying state, and died in six days in spite of arsenical treatment; but it appeared that at an early period of the affection there had been a decided improvement on two occasions under the use of small doses of arsenic. In the third case iron had been unsuccessfully employed together with other tonics, but on the administration of arsenic there was a continuous improvement. The red globules in three weeks had been increased threefold, and at the end of four months they were eight times more numerous; but two months afterwards there was a relapse, which again yielded to a fresh employment of arsenic, and health was restored, at least for nearly a year, during which Dr. Warfvinge occasionally saw the patient. In the fourth case the symptoms grew worse under the use of iron, but when arsenical treatment was adopted there was a gradual improvement: the health returned, and the number of red corpuscles was quintupled. But there was a relapse at the end of about seven months, and arsenic was again employed: health was again restored, and the red corpuscles were increased in number; a persistent diarrhœa, however, compelled the discontinuance of the arsenic, and the patient died from weakness. In the fifth case the malady was increased under the use of iron, and the patient

was at the worst when arsenical treatment was begun, but from that time there was marked improvement: the patient was able to leave his bed at the end of five weeks, and the blood was two-and-a-half times richer; when he left the hospital the number of red corpuscles was about four times more than at the beginning of the treatment. In the sixth case, which was less advanced, iron in large doses produced no effect, but after only eight days of treatment by arsenic the patient began to improve, and presented the appearance of health at the end of five weeks, the number of corpuscles being tripled. In the seventh case the result of the arsenical treatment was equally favourable: the health of the patient was remarkably improved after two months and a half of treatment, and the number of red corpuscles was largely augmented. It appears, however, that the patient died abroad, probably from a relapse. Dr. Warfvinge adds that two cases of pernicious anaemia are still under his treatment, and are slowly but uninterruptedly improving.

Dr. Warfvinge remarks that the fact of these three maladies—pernicious anaemia, leukaemia, and pseudo-leukaemia—being equally benefited by the use of arsenic seems to show a certain degree of relationship between them, and in proof of this position he passes in review the principal symptoms presented and the anatomical and pathological changes, particularly insisting on the changes in the blood. Although the three diseases exhibit certain points of difference, there is yet a character common to them all, namely, the diminution of the number of red corpuscles, with a modification of their form and size, the diminution depending less on the decrease in the formation of new corpuscles than on the abnormal destruction of the existing corpuscles. Dr. Warfvinge regards the alteration in the blood as the primary cause of these maladies, and he considers as secondary affections, caused by dyscrasie irritation, not only the changes in the spinal cord, but also the hypertrophy of the lymphatic glands and the spleen, and the lymphatic neoplasms in various situations. The alterations observed in the spinal cord, well known in leukaemia, he has also found in all the cases of pseudo-leukaemia and pernicious anaemia which have been examined after death, and he regards these alterations as common to the three affections, in all of which, moreover, there are anaemia with cachexia, a disposition to hemorrhages, especially of the retina, oedema in various parts and transudations, and fatty degeneration of different organs, especially the heart. The dose of arsenic employed by Dr. Warfvinge was four drops of Fowler's solution given two or three times a day, and four drops of the same daily when used as an injection.—*Med. Times and Gazette*, Aug. 4, 1883.

SURGERY.

Operative Procedures in Diseases of the Lungs.

Dr. BULL, of Christiania, in a recent paper reports an interesting case bearing on this subject. He also gives a brief review of the literature relating to the operations hitherto performed in diseases of the lungs, together with some observations on the indications connected with the opening of tuberculous cavities, and he draws attention to some new possibilities of limited expiratory expansion of the pectoral wall. The case was that of a man, twenty-nine years old, who entered the State Hospital of Christiania, exhibiting all the signs of advanced pulmonary tuberculosis, such as hectic fever, violent cough, abundant mucopurulent expectoration, emaciation, and anaemia. In the first, and partly in the

second left intercostal space, external to the left sternal border, there was observed during the fits of coughing a considerable and clearly limited expansion of the pectoral coverings, which circumstance was not observed in tranquil breathing. This limited expiratory expansion was considered due to a superficial cavity adherent to the thorax, and, perhaps, ulcerated by the pleural adhesion.

Viewing the possibility of the suspected cavity offering an advanced process of ulceration; of the secretion, incompletely expectorated, flowing into the neighbouring bronchi; considering that the fever and the cough were partly relieved by the opening of the cavity externally by means of drainage and disinfection, and that the expiratory expansion in front might perhaps indicate a commencing perforation of the thoracic wall;—taking all these matters into consideration, it was determined, with the consent of the patient, to try the operation. This was accordingly performed, and after the perforation of the thoracic wall the finger could be introduced into a small empty cavity, limited on all sides by smooth walls, and the base of which was formed by a solid elastic tissue. There was no sound of air entering or going out. The day after the operation, during a fit of coughing, there was a sudden discharge by the wound of a liquid like that of expectoration, and this discharge continued abundant, but without relief to the patient, and death ensued in six days. On post-mortem examination the left lung was found to be separated almost entirely from three to four centimeters from the thoracic wall, and there were only a few filiform adhesions with the upper parts. There was fibrinous pleurisy and a little pus in the pleural cavity. At the apex of the lungs there was a large superficial cavity. In other respects in both the lungs there were the usual indications of phthisis.

The differential diagnosis between a cavity and a pneumothorax in cases such as the above cannot be made with certainty, and considering the possibility of mistake, Dr. Bull advises that pulmonary operations should always be performed with the aid of antiseptics, so that if the incision reveals a pneumothorax the wound may then be closed and the operation be regarded only as “diagnostic.” Dr. Bull has found in medical literature the records of nineteen cases in which the opening of pulmonary cavities has been undertaken. Five of these, however, are imperfectly reported, or the diagnosis was too doubtful to be of any service. Of the rest of the cases, two were instances of bronchiectatic cavities, one was a case of bronchiectatic cavity and a cavity consecutive to pneumonia, five were cases of pulmonary abscess, three of pulmonary gangrene, two of tuberculosis, and one of echinococcus of the lung. The results of the operations were as follows, viz.: Cases perfectly cured, two; very marked improvement, two; more or less relief, seven; no ill consequences, one; cases made worse, two. As to the tuberculous cavities, experience is almost entirely wanting as to the effect of artificial pulmonary fistulæ, and it belongs to the future to demonstrate whether an operation of that kind is more dangerous in phthisical patients; but even when this proceeding might appear to be without danger, it should not be performed at a too advanced period of the disease.—*Med. Times and Gazette*, July 14, 1883.

Ulcer of the Duodenum.

In a recent number of the *Medizin. Jahrbücher* (1883, lft. i.), is an exhaustive paper on this subject by Dr. CRIVOSTEK, of Vienna, in which he brings out the following points in its history:—

1. *Pathogenesis and Etiology.*—The upper portion of the duodenum, in which the perforating ulcer most often occurs, is more directly under the influence of the acid contents of the stomach which play an important part in the pathological anatomy of the affection. The conditions for the origin of duodenal ulcers are

therefore very similar to what we believe to be true in originating round ulcer of the stomach, viz., the action of the gastric juice on a circumscribed portion of the duodenal wall, in which, by some circulatory condition, either by thrombosis or embolism of the small arteries (Virchow), or by some trouble in the venous circulation (Müller, Virchow, Rindfleisch), an extravasation of blood takes place in the mucous membrane and submucous tissue, or, according to Klebs, by ischaemia following spastic contraction of the bloodvessels. The experiments of Pannu have shown that obstruction of the calibre of the small arteries can produce these ulcers, and Müller has shown experimentally that obstruction to the circulation in the smaller branches of the portal vein can produce them. More recently Büttcher has sought to explain them as being due to a fungoid origin, and Hlava found, in one case, an ulcer the inflammatory appearances of which led him to believe that it originated in this manner. Finally Aufrecht found that by injecting cantharidin into rabbits an ulcerative process was set up in the mucous membrane of the stomach, with well-marked hyperaemia and capillary stasis. From this Aufrecht concludes that ulcers of the stomach are not due to a primary hyperaemia, but to a primary circumscribed gastro-adenitis. That they may be both due to the same cause is quite probable from the fact that in 237 cases of round ulcer Lebert found them together twenty-four times.

Perforating ulcer occurs much less frequently in the duodenum than in the stomach. In 79 cases of ulcer Rokitsky found it six times; Trier found it twenty-eight times in 261 cases, and Lebert found not a single one in 60 cases uncomplicated by round ulcer of the stomach. Chvostek has been able to find, in medical literature, since 1865, only 50 cases uncomplicated with round ulcer of the stomach. He himself has seen only seven such cases, one of which had an ulcer of the cardia.

The greater number of cases seem to occur between the ages of thirty and sixty years. In 47 cases 26 per cent. occurred before the age of thirty years, 56 per cent. between thirty and sixty. Perforating ulcer of the duodenum occurs much more frequently in males; in 64 cases observed by Kraus, 58 were in males (10:1); and Trier found in 54 cases, 45 in males, and 9 in females (5:1). Of Chvostek's 8 cases, only 1 was in the female. The general strength and occupation of the individual seem to have no influence in the etiology of the affection. Chlorosis is not so frequently a cause as in ulcer of the stomach. Hunger and want are not frequently causes except when they suddenly come upon an individual accustomed to better circumstances. Alcoholism, especially in the anorexial form, may be a cause.

There is no doubt that extensive burns of the surface of the body frequently cause perforating duodenal ulcers. In 125 cases of intense burn, Holmes found ulcer of the duodenum in 16 cases, and ulcers of other portions of the intestinal canal in 2 cases. Stokes found several ulcers of the duodenum and stomach in one case of severe burn. According to Mayer, the ulceration occurs in seven to fourteen days, and twice as frequently in females as in males. In 8 cases collected by Chvostek the shortest time in the male was two days after the injury (2 cases), and the longest seventeen days (1 case). The shortest in the female was two days (1 case), the majority occurring in ten days and upward. Lardier has reported 2 cases occurring during erysipelas. In a few cases foreign bodies cause perforating ulcers of the duodenum. Malherbe found, in a case of pemphigus, three small ulcers with consecutive peritonitis; Lignerolles observed ulcers of the stomach and duodenum in a case of acute pemphigus, and Barth in one of pellagra; and Ebstein found, in a case of trichinosis, a perforating ulcer of the stomach, the end being hastened by perforation. A certain predisposing cause exists in diseases which directly or indirectly affect the circulation in the duodenum.

a. First those which interfere with the portal circulation in the liver, as cirrhosis of the liver, and cancer of the liver, peritoneum, and pancreas. b. Heart diseases causing venous engorgement, followed by stasis in the portal radicles, and emboli in the duodenal vessels. c. Chronic pulmonary troubles, especially tuberculosis. Billroth is inclined to think that these cases are, in many instances, of septic origin, especially where the ulcer comes on after an operation, as is sometimes the case. There is a marked tendency to a second ulceration at the site of an ulcer which has cicatrized; a previously existing ulcer also predisposes to the formation of a new ulcer in its vicinity.

Pathological Anatomy.—As a rule there is only one ulcer, seldom two or more. In 58 cases, collected by Chvostek, a single ulcer was found thirty-nine times, two ulcers were found ten times, three and four ulcers were found three times each, and more than four occurred three times. Its most frequent seat is in the superior part of the transverse portion of the duodenum. It is generally round or slightly oval, and from two-fifths to three-fifths of an inch in diameter, though it may be larger. When healing and cicatrization take place, stenosis may result, varying from a very slight degree to almost complete closure of the bowel, with dilatation above the strictured portion, and the setting up of a chronic catarrhal process. A large stenosis, involving almost the whole thickness of the bowel, may cause thrombosis of the portal vein, as in a case reported by Frerichs. The ulcerative process may involve the bloodvessels, erosions of the gastro-duodenalis, pancreatico-duodenalis, and other vessels having been reported. In some cases the whole thickness of the intestinal wall is involved, and blood escapes into the peritoneal cavity. Chvostek has collected 23 cases in which this occurred, and in these cases, besides the hemorrhage into the peritoneal cavity, a circumscribed peritonitis is set up; this, however, may take place without complete perforation. Besides this the inflammatory process may cause adhesions between the duodenal wall and neighbouring organs, and fistulæ or abscesses may result.

Symptoms.—The affection may remain latent and only be discovered when some other disease has carried off the patient, or it may be first discovered when peritonitis is set up, or the patient may die suddenly from hemorrhage due to erosion of a bloodvessel. Of 63 collected by Chvostek, death occurred from perforation in 27 cases, from hemorrhage in 14, exhaustion in 6, pyloric stenosis in 2, 1 each in suppurative pylophlebitis, peritonitis of unknown cause, peritonitis from perforation of a round ulcer of the stomach, tuberculosis, paralysis, aortic aneurism, cerebral syphilis, coma after severe burn, stricture of the intestines after peritonitis, and from erysipelas in 2 cases.

According to Krauss, in one-fifth of the cases collected by him of perforation or hemorrhage there was no noticeable pain. There is, however, even when there is no positive pain, a sensation of pressure and uneasiness in the epigastrium, especially after taking food. In other cases the pain may be very severe, and of a constant gnawing character. Sometimes there is intense cardialgia coming on at a variable time, from half an hour to five hours after eating. Krauss has found the report of a case in which cardialgia after eating was a prominent symptom, having lasted for seven years, and was always relieved by a glass of brandy, though perforation and death ultimately occurred. The cardialgia [more properly enteralgia], after lasting for some time, may end in an attack of vomiting of partially digested food. Vomiting, however, seldom occurs in a case of perforating ulcer. Chvostek found it only thirteen times in 48 cases. In one case, recorded by Lebert, there was stercoraceous vomiting. The locality of the ulcer seems to determine the vomiting in great part; it more often occurs when the ulcer is situated near the pylorus. The pain is usually referred to the epigastric or right hypochondriac region, and is occasionally more violent at night. In chronic cases there may be

periods when the patient feels quite easy for some time, and then the pain seems to return with increased intensity. In the opinion of Krauss a continual pain, as eardialgia, is highly diagnostic of perforating duodenal ulcer. In many cases an uncomfortable sensation is produced by the slightest pressure, even of the clothes upon the abdomen.

Dyspepsia is not a prominent symptom in these cases; usually there is only the uncomfortable sensation in the epigastrium and right hypochondrium after eating. Chvostek agrees with Krauss that constipation is more common than diarrhœa in these cases. In his eight personal observations diarrhœa was present in one only.

Icterus is an infrequent symptom, and when present is due to catarrhal duodenitis and subsequent occlusion of the bile-duets by the catarrhal products. Krauss has found it reported in two cases, in one of which the catarrhal process had extended to the gall-bladder through a choleo-duodenal fistula. In Chvostek's 8 cases icterus occurred twice, there being a suppurative pylephlebitis in one case.

Profuse bleeding occurs in about one-third of the cases of perforating ulcer. Blood may be vomited or may pass in the stools. The hemorrhage is not unfrequently the direct cause of death. Dyspnoea and orthopnoea occur in ulcer of the duodenum as well as in gastric ulcer. In a case reported by Lebert so much wind accumulated under the diaphragm, from perforation, that pneumothorax had been diagnosticated. In chronic cases the patients gradually emaciate, lose strength, and acquire an earthy colour.

Diagnosis.—The diagnosis of duodenal ulcer is especially difficult. The symptoms are so similar to those of gastric ulcer that it is difficult to diagnosticate between them. A great point is to locate the pain definitely. The pain seldom occurs when the stomach is empty, but comes on after the ingestion of food. In a case diagnosticated by Chvostek during life, the pain came on regularly two hours and a half after breakfast, and three hours after dinner, and passed away after taking wine. This he considers a valuable point in the diagnosis, for had the ulcer been in the stomach the ingestion of wine would have increased it, for, says he, when the ulcer is in the duodenum the ingestion of the stimulant causes the pyloric orifice to contract and stop the passage of food outward. When pain occurs after eating, a diagnosis may be arrived at by seeing the result of full and spare meals. A spare meal, easily digested, is soon passed into the intestine, and the pain comes on sooner and lasts a shorter time than after a full meal of less digestible substances. After severe burns the diagnosis is less difficult, as in this case we may reasonably expect an ulcer of the duodenum. Duodenal ulcers are more frequent in males, the opposite is true with gastric ulcers. In ulcer of the duodenum the pain is less intense and less constant; colic and pain in the back are more constant and severe; vomiting, dyspepsia, and cachectic symptoms are less marked; and icterus, some diarrhœa, profuse hemorrhage and perforating peritonitis are more common than in ulcer of the stomach. Krauss proposes the administration of arsenic as a diagnostic means, as it would increase the pain of gastric ulcer. In some cases the diagnosis cannot be made, nor can we diagnosticate a gastric ulcer from one of the upper part of the duodenum unless we can clearly define the seat of pain. Perforating ulcer is diagnosticated from tuberculous ulcer chiefly by the constant diarrhœa of the latter, and the pulmonary and general symptoms.

Prognosis.—The prognosis of these cases is bad, and even if they recover from the ulcerative process, there is a great tendency to stenosis of the duodenum or of the common bile-duct, which eventually causes ill-health and death.—*Medizinischer Jahrbücher*, 1883, Hft. I.

Resection of the Intestine.

MM. G. BOUILLY and G. ASSAKY give, in the May and July Nos. of the *Revue de Chirurgie*, a critical review of resection of the intestine on account of gangrenous hernia and artificial anus.

Resection and Circular Suture of the Intestine in Gangrenous Hernia.—In the ten years that have elapsed since 1873 thirty-six cases of intestinal resection and suture in strangulated gangrenous hernia have been recorded. Of these there were 21 cases of femoral hernia, 11 cases of inguinal, and one of umbilical hernia, the variety not having been stated in the remaining three cases. The operation was performed 19 times on females, and 5 times on males, the sex not being specified in the remaining cases.

Uninterrupted recovery took place in 9 cases, 7 cases recovered after the formation and spontaneous closure of a stercoraceous fistula, making 16 complete recoveries. A persistent stercoraceous fistula was formed in one case, artificial anus was formed in one, and there were 18 deaths, making a mortality of 50 per cent.

M. Bouilly concludes, from an examination of the clinical histories, that resection of a gangrenous portion of intestine followed by immediate suture of healthy tissues is not only authorized, but indicated, and may be performed:—

1. When the general state of the patient is such that he can stand the operation with the prolonged administration of the chloroform, or where there is not a strong probability of a mortal termination by syncope, shock, vomiting, or pulmonary congestion.
2. When the close examination of the hernia and the actual nature of the accident enable the operator to reject the existence of general peritonitis or other grave complication.
3. When the operator is certain that no fecal matter has escaped into the peritoneal cavity.
4. When the operator believes that he can easily draw out the gangrenous intestine and mesentery, and resect in healthy portions.
5. When the continuity of the intestine can be established without having any great difference in the calibre of the resected ends.

The great dangers of the complete operation are: 1. The possibility of rupture, either by its own insecurity, or from extension of the gangrenous process, and consequent escape of feces; and 2. The persistence of the strangulation.

Resection and Circular Suture of the Intestine in Artificial Anus.—29 cases of enterectomy with enterorrhaphy for artificial anus are given; 17 cases were successful; death occurred in 11 cases, and failure in 1. In the large majority of cases (26) the artificial anus was consecutive to gangrenous strangulated hernia.

M. Bouilly thinks this operation is indicated: 1. In cases in which compression, application of the enterotome, sutures, autoplasty, etc. have not been attended with success.

2. When, after careful examination, the precise condition cannot be made out.
3. When the operator recognizes an abnormal position of the intestinal extremities or superposition, or crossing at a distance from each other, or a marked difference in the calibre of the two extremities, or several perforations at the same point.
4. When there exists an irreducible prolapse of one extremity of the intestine; still more if both extremities be prolapsed.
5. When there is an extensive prolapse of mucous membrane with or without invagination of the subjacent portion of the intestine.
6. When the operator has recognized an artificial anus without a spur-like projection between the two extremities, and accompanied by so large a loss of substance that a suture of the borders of the opening cannot close it.

Resection of the Intestine.

Dr. TERESINO PRATI gives the history of a case in which he resected $2\frac{3}{4}$ inches of intestine. When the case was seen the diagnosis of *strangulated left crural hernia, entero-epiplocele, which was in all probability gangrenous*, was made. The woman was æt. 61; in her 12th year she had had inguino-crural hernia of the left side, and in the 17th year had umbilical hernia following delivery. No cause could be assigned for the occurrence of the present difficulty; it came on suddenly during the night. Five days after it appeared she came under observation. Prati determined to open the sac, reduce, and, if necessary, perform resection. The patient was chloroformed, the salicylate spray used, the parts washed with a disinfectant solution, and an incision of about $3\frac{1}{4}$ inches in length made along the greatest diameter of the tumour and parallel to the inguino-crural fold. The sac was found filled with sero-sanguinolent fluid, of which it was emptied, and it was then found that a portion of the peritoneum was included in the hernial sac. The intestine was of a dark slate colour, œdematous, and distended with gas. It was also found that there was an adhesion of the intestine to the neck of the sac, which it was impossible to rupture safely. A further examination revealed a large ulcer in the non-mesenteric portion of the circumference of the intestine which had been caught in the neck of the sac. The strangulated portion of the intestine measured about $1\frac{1}{2}$ inch, was œdematous, slate-coloured, and contained the ulcer already mentioned. Fearing that, if the intestine was returned in that manner, there would be perforation and escapes of fecal matter through the ulcer, Prati resected $2\frac{3}{4}$ inches. Excision of the margin of the ulcer and subsequent suture were not feasible in this case, as a large part of the lumen of the intestine was destroyed. The patient died twenty-eight hours after the operation, apparently from shock.

Prati draws the following conclusions regarding resection of the intestine: 1. Intestinal resection is a rational operation. 2. One may resect a small portion of intestine without completely disturbing the digestive functions. 3. In performing the operation the resected portion must extend into healthy tissues. It is extremely important that the peritoneal surfaces unite by first intention, and in order that this may be brought about, healthy tissues must be brought into apposition. 4. The indications for the operation are carcinoma, epithelioma, and other intestinal tumours, fibrous or cicatricial stenosis, and gangrene from strangulation. 5. The patient may be fed *per orem* with liquid food, or rectal alimentation should be employed. No solid substance should be allowed to pass the intestinal wound. 6. It is certain that the patient, in the case reported, died of shock.—*Annali Univers. di Med. e Chir.*, June, 1883.

Inguino-properitoneal Hernia.

Dr. MAX OBERST describes a case of this form of hernia which was operated upon in Volkmann's clinique at Halle, in June last. A man, aged 25, had had a serotal hernia on the left side for eight years, for which he wore a truss. Twenty-four hours before admission to hospital it had come down in consequence of a severe lifting effort, and resisted all attempts at reposition. On admission, he was found to have a left serotal hernia of considerable size, and there was noted a globular bulging of the abdominal parietes above, and external to the external ring. The serotal hernia was easily reduced by taxis under chloroform, but immediately returned when the pressure at the ring was removed. When the hernia was reduced the swelling above noted was markedly increased, diminishing again as the hernia was allowed to descend again into the scrotum. Diag-

nosis was made of "Hernia inguino-properitonealis," and as the symptoms were not urgent, the scrotal hernia was reduced, and a bandage applied to retain it in position. Next day the patient was much weaker, complained of pain, and suffered from meteorism and stercoraceous vomiting, and it was found that the hernia had slipped down beneath the bandage. Herniotomy was then performed, and a small atrophied testicle was found lying in the canal beside the loop of bowel, showing the hernia to be a congenital one. The external ring was found to be wide, and the bowel was reduced easily without enlarging the opening, but, as before, came down again whenever pressure was removed. Upon drawing down the intestine so as to permit further digital explorations of the canal, it was found that the gut had not been returned into the abdominal cavity at all, but into a wide space extending between the peritoneum and the overlying tissues towards the anterior superior spine of the ilium, and communicating directly with the sac through the external ring. This cavity communicated with the abdominal cavity by a small, tight, well-defined ring, which was found to be firmly constricting the protruded loop of bowel. When this ring was dilated with the tip of the finger, the bowel was easily replaced in the abdomen, passing away for the first time with characteristic "slip and gurgle." The wound was allowed to heal by granulation, the edges of the sac being stitched to the edges of the external wound, and the patient made a good recovery.

The following references on the subject are given in Dr. Oberst's article: Krönlein, in *v. Langenbeck's Archiv*, Bd. xxv., and *Archiv f. Klin. Chir.*, Bd. xix. and xxii.; Neuber, in *v. Langenbeck's Archiv*, Bd. xxii.; Rossunder, in *Hygieia*, Jan. 1881; Trendelenburg, in *Verhandl. d. deut. Gesellsch. f. Chir.*, x.; Kongress and Bolling, in *Berlin Klin. Wochenschr.*, 1882, No. 26.

The special features of this form of hernia are in the description of the case given above; one feature generally noted in such cases is that the symptoms of strangulation are not urgent. In 20 out of 28 recorded cases the hernia was of the congenital form.

The cause of this peculiarity in the congenital form, according to Trendelenburg, is the persistence of a cavity which must exist at a certain stage in the descent of the testis; another instance of arrested development. In acquired cases, according to Krönlein, the cause is mechanical, the pressure of a badly fitting truss or repeated attempts at taxis forcing the internal away from the external ring, and dilating the sac or canal into the pouch between the layers of the parietes.

Dr. Oberst suggests that when the condition is recognized, the internal ring might be dilated with the tip of the forefinger, pushing the skin of the scrotum before it up through the external ring, except, of course, where the condition of the bowel is doubtful. If this fails, herniotomy, as in his own case, is necessary, and if that also failed, then Trendelenburg's method might succeed, viz., laparotomy and reposition of the bowel by traction from within.—*Glasgow Med. Journal*, July, 1883.

Removal of Large Renal Tumour by Abdominal Section.

Dr. HENRY G. RAWDON reports the case of a female child, æt. 16 months, first seen on August 31, 1882. The mother stated that she first observed a swelling on the left side about two months previously, and that, coincident with the enlargement, she noticed her becoming fretful and poorly, and getting much thinner.

The child had, for a few weeks prior to admission, been brought as an out-patient; during that time the tumour had increased, but not to any marked extent.

The tumour, which was easily made out, occupied the entire space between the left costal cartilages and the crest of the ilium. It extended at least an inch beyond the median line, and could be felt in the lumbar region. The tumour was to a certain extent movable, and on palpation gave the impression of a solid elastic growth of a globular shape, with a generally smooth surface, but with two or three prominences upon it. The urine was ascertained to be free from blood and albumen. On September 2, under antiseptic precautions, an incision was made in the linea alba, extending about two and a half inches above and an inch below the umbilicus. As soon as all bleeding had ceased, the peritoneum was divided and the tumour reached. The descending colon passed downwards over the tumour, which was very intimately embraced by it, the peritoneal attachment of this intestine being so connected with the tumour that it could only be separated with great difficulty, from fear of laceration.

When the growth was freed from its connections, the pedicle, which included the renal artery and veins, was securely tied with carbolized silk. The ureter—together with some cellular adhesions—was separately ligatured.

The pedicle was now divided at a safe distance from the ligatures, and, after enlargement of the external wound, the tumour was removed. During the operation there was an unavoidable loss of a small quantity of blood—probably not more than an ounce—from tearing adhesions connecting the colon to the tumour in the first instance, and its cellular attachments. Before putting in sutures and closing the wound, the cavity in which the tumour lay in the lumbar region and the pelvis was carefully sponged out, and no oozing was noticed.

The child was much collapsed for two hours, but then slowly rallied fairly well. In the evening she seemed free from pain, was able to take a little nourishment, and appeared to be doing as well as could be expected, but in the night, fifteen hours after the operation, she sank somewhat suddenly.

An examination was made next day. The peritoneum was found to contain about an ounce of altered blood, or sanious serum. The ligatures were found to be secure; the small oozing must, therefore, have come from torn adhesions.

The cause of death was not clear, but suspicion pointed to commencing septicæmia or peritonitis, or possibly it may have been due to the antiseptic (*i. e.*, carbolic spray and dressings).

The tumour was decidedly carcinomatous; it was globular in form; the prominences upon it were more rapid growths of the same kind, only more friable and softer. Internally it contained several cysts, inclosing a deep straw-coloured fluid. It weighed sixteen and a half ounces. No trace of the true renal structure remained.—*Liverpool Med.-Chir. Journ.*, July, 1883.

OPHTHALMOLOGY AND OTOTOLOGY.

Dilute Solutions of Eserine in Weakness of the Ciliary Muscle.

Dr. JOHN C. UNTHOFF contributes a paper to the *Brit. Med. Journ.*, July 7, 1883, on this subject. The therapeutic use of weak solutions of eserine was first pointed out to him by Mr. Bader, about a year ago; and since then he has made trial of them in a large number of cases of failure of accommodation, and with very considerable success. He generally orders a $\frac{1}{40}$ grain solution to be used three times a day, and he warns the patient that he may experience some unpleasant twitching of the eyelids, and possibly a little dimness of sight, for a short

time, after applying the drops. In some cases benefit has accrued at once, has continued as long as the drops have been used, and has lasted for a varying period after their discontinuance. In some, the improvement has passed off, and I have been obliged to increase the strength of the solution in order to continue the effect. In other cases, and they have been few, no benefit whatever has resulted.

He has found these solutions more especially beneficial in two classes of patients.

The first and chief class consists of cases of slight hypermetropia in young adults, where the error of refraction has caused no defect of vision until—through some failure of general health, or perhaps from overtaxing the eyes by an excess of near work—the power of accommodation has failed, and then there has arisen an array of troubles sufficiently well known; headache after near work, and inability to continue at it for any length of time, especially if by artificial light, being chief among the number. In such patients the treatment is particularly valuable, and may keep the power of near vision at its normal standard, until with rest and an improvement of the general health, the muscle recovers its normal power. As an example of this class he mentions the case of a young lady, who was sent to me suffering from all the troubles incident to the presence of an accommodating power insufficient to compensate for the slight amount of hypermetropia (1 D) which existed. Her sight had been good until a few months before coming to me, when she thought she strained her eyes by doing an unusual amount of near work by artificial light. Her far vision was good, and she could read D 0.5 Snellen for a short time with ease. The use of $\frac{1}{40}$ grain solution of eserine three times a day caused immediate improvement, and at the end of a fortnight she wrote to me saying that she was able to paint and read steadily and with comfort for a much longer period than she had been able to do for six months before.

Secondly: patients with high myopia, even when fitted with suitable glasses, are sometimes unable to use them with any comfort for near vision, this being often in great part due to the feeble accommodating power such myopic eyes possess. These persons will speak gratefully of the benefit they derive from the use of weak solutions of eserine.

Trephining the Pyramid of the Petrous Bone.

GLUCK attempted on the cadaver to ligate the internal carotid in its canal, and succeeded in fifteen cases in chiselling out the artery in its whole course, without wounding the jugular vein or the transverse sinus. He therefore believes that, in conditions which demand trephining of the mastoid process, we can gain a more radical cure by resection of the pyramid of the temporal bone with the chisel. The author subsequently had an opportunity of proving in a case that such an operation was feasible. A patient with chronic suppuration of the middle ear was suddenly attacked, after previous and repeated hemorrhage from the right ear, with violent headache, sudden fainting, convulsions, and amaurosis, which were followed by a soporous condition, facial paralysis, and paralysis of the right arm. A collection of pus between the dura and pia maters, as a result of the otorrhœa and erosion of the internal carotid, appeared to be the probable condition, and was thus diagnosticated. After chiselling away the posterior wall of the meatus, a portion of the mastoid process and of the temporal bone, the dura mater was extensively exposed, as a bluish, tightly-stretched, fluctuating sac. The dura mater was then opened, whereupon about 60 grm. of thick fetid pus which had lain between the dura and the pia escaped. The finger could be pushed up into the cavity as far as the internal occipital protuberance. Death ensued on the following night. At the post-mortem examination the dura mater

was found sunken into the slightly concave surface of the brain upon the operated side, while its inner surface, from the longitudinal sinus to the base of the brain, was covered with an adherent layer of pus. The base of the skull was unaltered. There does not seem to have been any accurate examination of the ear, from which, however, the disease had its starting-place.—*Archives of Otology*, June, 1883.

MIDWIFERY AND GYNÆCOLOGY.

Extra-Uterine Pregnancy.

Professor A. I. KRASSOWSKI records an interesting case of extra-uterine pregnancy which he successfully interrupted by means of paracentesis through the vaginal fornix. The patient, aged 23, had two normal labours. Her third pregnancy was recognized as extra-uterine by Dr. I. F. Smolensky, who based his diagnosis chiefly on the presence of a gradually growing, moderately movable, painless, ovoid tumour felt in the lesser pelvis through the left half of the vaginal fornix as well as through the thin abdominal wall. From the rather enlarged but empty wound, the tumour was separated by an interspace of a finger's breadth. Having been called to the patient, the author confirmed Smolensky's diagnosis. He found also that the swelling consisted of two distinct parts: the anterior (nearest to the abdominal wall) solid, and the posterior soft and fluctuating. The late Professor M. I. Horwitz and Dr. V. N. Etlinger, consulted by the author, agreed with him in regard both to his view of the case (tubo-ovarian pregnancy about the end of the fourth month), and to the urgent necessity of arresting the further course of pregnancy. Accordingly, a long curved trocar, as large as a raven's quill, was plunged into the fluctuating part of the tumour. About three and a half ounces of a clean transparent fluid escaped, the last portions being tinged with blood. No untoward symptoms followed, except that, from the third to the tenth day after the operation, there was observed some oozing of dark thick blood from the uterus. A month later, quite normal catamenia appeared. The tumour began to shrink and to become denser, more uneven, and more movable. Two months after the operation its size was only a half of the former bulk. The general state of the patient remains quite satisfactory. Professor Krassowski joins Spiegelberg, Sehröder, Fränkel, and others in recommending puncture of the ovum in every case of suspected tubal or tubo-ovarian pregnancy.—*London Med. Record*, July, 1883.

Metria.

In the Section of Obstetric Medicine at the annual meeting of the British Medical Association in August, 1883, an interesting and instructive debate occurred on this subject.

Dr. LOMBE ATTHILL, in opening the discussion, said that the pathology of metria is still far from being perfectly understood. Two facts alone are admitted by all who have studied the subject carefully: namely, first, that puerperal women are liable, under certain circumstances, to be inoculated with septic matter conveyed to, and deposited in, the vagina by the hands of the attendants, as well as by other agencies, when, either through carelessness or ignorance, proper precautions have not been adopted to prevent such an occurrence; and that the disease produced by such inoculation is not an unfrequent source of one of the forms

of metria; secondly, that puerperal women may be self-inoculated by poisonous matter originating within their own bodies, from the decomposition of blood-clots formed within the uterus after parturition, or of portions of the membranes or placenta which have been retained *in utero*; the only difference of opinion on this point being, that Dr. Matthews Duncan and others term the disease thus produced “sapræmia”—that is, resulting from the absorption of putrid matter—thus distinguishing it from “septicæmia,” or the disease produced by “organisms which, when conveyed to the blood, multiply indefinitely in it;” while those which are the product of putrefaction “do not survive, far less grow, therein.” (Dr. Matthews Duncan on Puerperal Fever, *Lancet*, Nov. 6, 1880.)

I hardly think that any one will dispute the correctness of the foregoing points; they have been established beyond all doubt; and it is certain that poison, introduced into the system by one of the two ways indicated, is the cause, in the vast majority of cases, of so-called puerperal fever, whether occurring in private or hospital practice. But there are many who believe that the whole subject is summed up in a belief of these very important propositions, and who think that to go outside of these lines is only to cause difficulty and to create confusion. I admit this; but it seems to me that such an argument is almost an appeal *ad misericordiam*, and that it cannot be admitted for a moment. I believe that, in addition to the two preventable forms alluded to above, we have others; and I ask the members of this Section to consider whether we have not, in addition to these, two other forms of metria, which it may not be possible to guard against—namely:—

1. A form of self-infection, occurring under special conditions, to which I shall allude by and by, which is not preventable by the adoption of any antiseptic treatment.

2. An epidemic, highly infectious, form, which spreads by the same means as ordinary epidemics do.

Before commencing the discussion of these propositions, it is essential to bear in mind that I entirely concur in the opinion now generally held, that septicæmia, occurring in a puerperal woman, is not capable of being communicated to another puerperal patient by any means other than the direct transfer of the infectious matter to some portion of the mucous membrane lining the genital tract. Septicæmia, however, when it attacks a puerperal woman, may be spread by various agencies, as well as by the hands of the attendant—for instance, by the nozzle of a syringe, by the use of infected sponges, by imperfectly washed napkins, bed-linen, etc.; but not through the medium of the air breathed by the patient. Of the truth of this I have not the slightest doubt.

You will observe that I have spoken of the two ordinary forms of puerperal septicæmia as being preventable. It is evident that, with thorough cleanliness, and the use of antiseptic precautions, septic poison should never be introduced into the patient's system by the attendants; further, I believe that it is possible to prevent self-infection in a healthy woman, by adopting precautions to insure a good and permanent contraction of the uterus, and by washing out the uterus whenever we have reason to suspect the existence of clots, etc., in it, with a disinfecting fluid. With the former object, I make it a practice to put all patients in whom a relaxed condition of the uterus exists, on ergot, from the moment labour terminates, continuing its administration for at least a week. I believe a relaxed condition of the uterus to be a very common predisposing cause of self-infection in puerperal women; it favours the formation of clots *in utero*, and also, the orifices of the uterine sinuses being left open, the absorption of septic matter is favoured.

In proof that I do not exaggerate the importance of imperfect contraction of

the uterus, as a main factor in the production of puerperal septicæmia, I may point out that I recently saw, in consultation, three patients suffering from this affection, in all of whom labour had been so rapid that the child was born before the arrival of the medical attendant; and it is a well-known fact that relaxation of the uterus is very liable to follow the too rapid emptying of that organ.

This train of reasoning has led me to believe that imperfect uterine contraction is one of the causes of the frequent occurrence of septicæmia in unmarried women. The mortality from septicæmia amongst them is very great, and there is no doubt but that the great mental distress these poor creatures suffer, interferes with the recuperative process which should take place rapidly in the uterus after parturition. The muscular fibres of the organ do not contract as they should; the blood-supply, consequently, is not cut off, the mouths of the sinuses remain open, the denuded placental site, instead of becoming rapidly restored to its normal condition, becomes unhealthy, and the fetid discharge, which, under these circumstances, takes the place of the normal lochia, either enters the system directly through the open mouths of the placental sinuses, or is absorbed at the site of some fissure in the mucous membrane lining the genital track. This is one form of puerperal septicæmia which I fear is beyond the reach of preventive treatment. No antiseptic precautions can prevent its occurrence, no treatment that I know of will stay its progress. In patients suffering from certain forms of chronic disease a similar condition is observed, and similar results follow.

In my opinion, the infection arising from any of the forms of metria to which I have alluded, cannot be carried by the attendants from one patient to another, if precautions be adopted to prevent it. And only a year ago I was strongly inclined to believe that epidemics of so-called puerperal fever would not occur as long as such precautions were adopted. Those enforced by me among the pupils attending the Rotunda Hospital were the following:—

1. Students attending the practice of the hospital should not undertake *post-mortem* examinations, be engaged in dissections, or attend a hospital containing patients suffering from infectious diseases; and.

2. Before proceeding to examine any patients, they washed their hands in a solution of carbolic acid.

During the first six years and a half of my mastership, these sufficed to prevent the occurrence of anything like an epidemic of so-called puerperal fever. Deaths from septicæmia, especially among unmarried women, from time to time occurred, but the disease never spread; in August last, however, the hospital being at the time extremely healthy, a patient was admitted who complained of pain in the abdomen, and who vomited constantly, the fluid ejected being greenish. She stated that she had been in labour for more than twelve hours, and that, during the whole of that time, she had been vomiting; and it was subsequently elicited that she had been complaining for some days previously, and also that she had been seen, at the commencement of labour, by some practitioner, who advised her to go into hospital. The os, at the time of admission, was about one-third dilated, labour progressed very slowly, and she finally was delivered by the forceps. Vomiting ceased after delivery for a time, but soon recurred, every thing swallowed being ejected, with large quantities of greenish fluid. The abdomen became tympanitic, the pain intense, matters went from bad to worse, and she died on the fourth day after delivery. Her appearance strongly resembled that of a patient suffering from typhus fever.

Another patient was admitted on the same day as the last patient, and she lay for a short time in the bed next to her. The patient's labour also was slow, but it terminated by the natural efforts. She was attacked with symptoms of acute

peritonitis thirty-six hours after delivery, and almost immediately afterwards we noticed a very peculiar, almost black, appearance of the face. The course of the disease was identical with that of the preceding case, but was even more rapid. The first symptoms showed themselves on the morning of the 29th, and she died on the 31st.

The disease now spread rapidly, and so virulent was the epidemic that, out of twenty-nine women admitted during six days which intervened between the delivery of the first patient and the issue of the order to refuse admission to all applicants, eleven women were attacked, and nine died.

The admission of patients being stopped, the wards were thoroughly disinfected, the walls lime-washed, the floors washed with a strong solution of chloride of lime; the cupboards, presses, etc., scoured; the nurses' clothes, as well as their bedding, being washed and aired, and placed in the hot-air chamber. Patients were re-admitted on September 12th; and from that date till the expiration of my mastership on November 4th, during which time 118 women were admitted into the hospital, the health of the patients was excellent, and, I am informed, continues to be so still. No more successful effort to stamp out disease than this was ever recorded. This, and the fact that the epidemic was distinctly imported into the hospital, and that it did not originate in it, are facts as important as they are satisfactory; and though the occurrence of the outbreak was a cause of great distress to me, and though it was a great disappointment that, at the very close of my mastership, such a misfortune should have happened, still these two facts lessened the regret I naturally experienced.

Some years previously, a patient suffering from erysipelas of the head and face was, during the night, sent up to the labour-ward, her condition not having been detected till she was being undressed. The child's head was in the perineum, and she could not be sent out. She was at once removed to a separate ward, and early next morning transferred to a fever hospital; but though her stay in the lying-in hospital was so short, several patients were attacked, not with erysipelas, but with so-called puerperal fever, and one died. The disease was limited to the one ward. I ask you, gentlemen, to consider what the disease attacking these women was. To me it seems to have been a disease originating by the introduction into the system of a puerperal woman of the infection of erysipelas, which infection was modified by the peculiar state of the system and of the blood which exists in puerperal women, and which, therefore, developed an apparently different disease; and I am strongly inclined to the belief that outbreaks of so-called puerperal fever, when it assumes an infectious and epidemic form, are due to the introduction of the poison of some ordinary zymotic disease into the system of a puerperal patient, the symptoms being, under such circumstances, totally different from those occurring in cases of septicæmia.

Dr. THOMAS MOORE MADDEN said that having been for upwards of twenty years in practice, and having been for some years connected with the largest lying-in-hospital in Great Britain, I have had some opportunity of gaining experience on this subject. I have, therefore, no hesitation in saying that, in common with others who have had similar experience, I am as convinced as I can be of any fact whatever of the existence of puerperal fever or a specific infectious disease peculiar to puerperal women. The entity of this disease is in no way affected by whatever name we may choose to term it; and whether we speak of it as puerperal fever, metria, septicæmia, utero-peritonitis, sapræmia, or by any other appellation, its distinct existence remains unmistakable as that of measles, scarlatina, typhoid or typhus fever, or any other zymotic disease; although its predominant symptoms are varied, as those of these diseases also are, at different periods, and during different epidemics, by the prevailing atmospheric epidemic

constitution, by the general condition of the patient, by the intensity of the septicæmic intoxication in each case, and by a variety of other modifying circumstances.

He regarded it as a zymotic infective disease, prevailing periodically as an epidemic, and being, moreover, endemic in some places, under certain circumstances. It is unquestionable that the disease may result from infection with the poison of other zymotics, such as erysipelas, scarlatina, and typhus fevers, as well as be induced by auto-inoculation with septic matter self-generated in the patient's system, or by hetero-inoculation with septic matter introduced from without.

Amongst the causes of puerperal fever, some reference should be made to laceration, during labour, of the cervix uteri. This accident, especially where the injury has been occasioned by the abuse or premature employment of the forceps before the natural dilatation of the os, is probably a very important, though generally entirely unrecognized, factor in the modern etiology of puerperal septicæmia. Under such circumstances, the danger of rupturing the undilated parts is self-evident. And it is equally obvious that thereby is afforded a ready channel for the auto-inoculation of the patient with any septic poison existing in the lochial discharge, which may be absorbed through the raw edges of the lacerated surfaces, and thus give rise to septicæmia. There can be no question as to the toxic effect of inoculation with even apparently healthy lochial matter; and, therefore, much more likely is this to occur when the lochia are in an abnormal or vitiated condition, as is so generally the case a few days after difficult and instrumental deliveries.

The treatment of puerperal fever, he said, must be governed by the predominant symptom of each case, and depends largely on the prevailing epidemic type of the disease, which varies widely at different times. Even within the comparatively short period included in my own obstetric experience, several changes have taken place in the prevailing type of puerperal fever in successive epidemics, and hence in the treatment required. We now seldom, if ever, meet with the true inflammatory utero-peritonitis, for which, in my student days, mercury with opium, and free depletion by leeching, were almost invariably prescribed. I well remember often seeing the puerperal patient's abdomen covered, under such circumstances, by what the late Dr. McClintock graphically described as a poultice of leeches. And, I may add, that I have still a lively recollection of the benefits derivable, in appropriate cases, from this line of treatment. Within the last fifteen or eighteen years, however, I have never seen a case of puerperal fever in which any form of depletion could be tolerated; the disease having now, in common with all others, assumed an asthenic or typhoid form, and like them appearing more in the character of a septicæmia than of a true inflammatory malady.

Thus, when, some years after my first acquaintance with the practice of the Rotunda as a student, I became one of the medical staff of the same hospital, two forms of puerperal fever came before me; one with marked uterine pain and tenderness and abdominal distension, and the other without any localized pain; both accompanied by a low typhoid condition tending to death, and obviously requiring stimulation, and especially the free use of turpentine by the mouth, by enemata, and by external application in stuping the abdomen. The form of puerperal fever now most frequently met with is distinctly remittent in its type. Several cases of this kind have come under my observation in which the fever was of the tertian character. Still more usually, however, there are daily matutinal remissions. Thus the temperature and pulse in the second week of the illness often fall each morning to little above normal, and again rise throughout the

afternoon, until in the evening the former has reached 105°, and at the same time the pulse becomes about 120.

In the treatment of the remittent forms of puerperal septiciæmia, our main reliance must be placed in quinine. This should be given in medium doses of from three to four grains at short intervals of three to four hours, and continued until the pulse and temperature have been sufficiently reduced, and cinchonism has been maintained for some days.

I may here repeat that, with very few exceptions, all the cases of puerperal fever I have recently seen were of an essentially asthenic type, presenting all the symptoms of so-called malignant puerperal fever or septiciæmia, and, consequently, were not suitable cases for any form of depletion; but, on the contrary, required the free use of stimulants and nutriment.

Whatever other treatment may be indicated, however, the use, twice daily, of warm antiseptic intra-uterine and vaginal injections is essential in every case of puerperal septiciæmia. The use of such injections, for the purpose of thoroughly washing out septic exudations from the cavity of the uterus, is self-evident. But, at the same time, it should be said that they require to be used with far more caution than is generally practised. Nor should we ever fail to impress on the nurse, in such cases, the risk of probably injecting virus into the open uterine sinuses; or, on the other hand, of forcing the injected fluid through the patulous Fallopian tubes. I have more than once seen injury caused, in both these ways, by want of such caution in the use of the ordinary siphon syringe.

Dr. ALEXANDER (Liverpool) said there were two kinds of so-called puerperal fever; the first where the disease was in reality erysipelas, typhus or scarlet fever. In such cases, the epidemic disease modified the conditions of the lochia, and produced a metria that, in its turn, modified the epidemic disease. In the other class of cases, the disease always began in the uterus, and was really a septiciæmia dependent on the altered conditions of the uterine contents, produced by obstruction to the flow of lochial fluid, nervous conditions that relaxed the uterus, putrid poison introduced from without, etc. The putrid discharge was absorbed, and poisoned the patient. Acting upon this theory, his treatment had been, whenever the fever was high, to make the uterus contract by pressure of the hand on the abdomen, and put on a firm binder. He gave a dose of ergot and liquor ammoniæ acetatis, continued every four hours. If the patient's temperature did not soon abate, *i. e.*, in a few hours, he washed out the uterus carefully once, and continued the former treatment. Since adopting this treatment, he had had no trouble with puerperal fever. The treatment must be adopted early.

Dr. WYNN WILLIAMS (London) considered those cases only as puerperal that were due to septiciæmia, which might arise either from within or without the body; when arising from without, there must be suppuration, such as there was in scarlet fever, erysipelas, etc. It generally, however, arose from within, due to the retention of clot or other animal matter becoming putrid. The object, then, was to destroy the septic matter, which was best done by syringing the uterus with tincture of iodine, three drachms to eight ounces of water, and continuing the process until the fluid returned of the same colour as before. Experiments on guinea-pigs had satisfied him that iodine and septic poison could not exist together. A practitioner might surely free himself from all trace of septic poison by placing some grains of iodine in a saucer, and applying a spirit-lamp to the bottom of, and allowing the fumes to fall over his person.

Dr. A. D. MACDONALD (Liverpool) was happy to support the view of Dr. Wynn Williams that washing the hands with a weak solution of iodine was a great means of prophylaxis. He had recently attended cases of erysipelas and

of scarlatina—using this solution—and having no metria following. A short time ago, he was called to a case of puerperal fever delivered by a midwife where she, after warming and using the iodine, as well as having a short holiday, had not had a bad case. This case illustrated the communication of the contagium through hand-shaking with a nurse who had attended a case of septicæmia.

Dr. EDIS (London) thought the whole question of metria was of so much importance to the practitioner, that anything throwing light upon it was of interest. Prevention was the key-note: not to allow the patient to drift into powerless labour; to secure efficient contraction of the uterus and expulsion of all the decidua; to be scrupulously clean in all the appointments of the lying-in room and in those in attendance there; to avoid all risk of infecting the patient with any contagion, whether exanthematous or otherwise. If febrile symptoms occurred, the proper course was to wash out the uterine, to sustain the patient's powers by appropriate nourishment, and stimulants if necessary, and to encourage rather than check the natural tendency to vomiting or diarrhœa. Quinine and opium should be given, or iron, as might be indicated. The mere name of puerperal fever was merely a comprehensive term to express very many varied conditions occurring in the lying-in patient, and not any specific disease.

Dr. GRAJLY HEWITT, in closing the discussion, said that, although the speakers had expressed opinions of a different character, there was a general concurrence on certain important general principles, and that this serious disease must be considered as not only preventable, but in most instances curable. The prevention of the disease was secured, first, by prevention of the introduction of septic matter from without. The antogenetic cases were, he considered, common; and in this class of cases the important point was to raise the health and strength of the patient, and thus prevent absorption by ensuring active contraction of the uterus. Mr. Burton's and Dr. Alexander's observations showed the great importance of uterine contraction in curing the malady. On this subject, he was pleased to find the treatment found so successful by Dr. Alexander was identical with that recommended by himself at the discussion on puerperal fever at the Obstetrical Society of London some years ago. He mentioned a case of mental shock producing severe metria, cured by pressure, copious administration of food, and stimulants. Here the pressure was found sufficient without intra-uterine injection.—*British Medical Journal*, Aug. 11, 1883.

Dysmenorrhœa.

Dr. VEDELER, of Christiania, in an exhaustive article on this subject, declares that ergot is a good remedy in severe cases of dysmenorrhœa, though it has not the same action in all cases; the definite indications must be sought, and the history of each case entered into as far as possible.

Mackintosh first definitely described mechanical dysmenorrhœa, though Capuron, Lisfranc, and Fingerhuth had already mentioned a contraction or stricture of the cervical canal as a cause of painful menstruation; and more recently Simpson and Marion Sims have still more clearly described it. In some cases nothing more than an abnormally small uterine cavity can be discovered to account for the dysmenorrhœa. These cases of the affection, often intermittent, are very difficult to recognize.

Vedeler takes issue with Emmet when he says that "every woman, even in health, will experience at least some degree of discomfort at the menstrual period; that she should be entirely free from pain and suffer no inconvenience at this time is an abnormal condition;" and gives three tables of 252 menstruating women who came under treatment for various affections. In none of the cases

was there any pain. The first table includes 59 virgins; in only 12 of these was the cervix in its proper position. The remaining 47 had various degrees of flexion. In 3 the cervix and uterine body were parallel to each other. Of the diseases for which they came under treatment, 8 were anæmic, 11 had cardialgia, 3 chlorosis, 3 amenorrhœa, and 5 cephalalgia, while others complained of bronchitis, neuralgia, etc. The second table includes 101 unmarried women. In 36 cases the axis of the uterus was a straight line, axis normal in 13, anteversion was present in 14 cases, and retroversion in 9. The uterus was flexed in 65 cases. Of the diseases for which they came under treatment anæmia was present in 7 cases, cardialgia in 9, chlorosis in 4, and amenorrhœa in 2, besides other affections. On examination the external os was found to be small in 8 cases. In 19 cases the uterus was small; chronic parametritis of the uterus existed in 3 cases, of the cervix in 6, endometritis in 14, and chronic perimetritis in 4 cases. The third table embraces 92 patients, married; in 44 the uterine axis was a straight line, the axis was normal in 15, there were 20 anteversions, and 9 retroversions. The remaining 47 had more or less flexion. As before stated, there was no pain at the menstrual period in any of these 252 cases, although the axis uteri was markedly abnormal in 56. From this, says Vedeler, it seems that dysmenorrhœa cannot be entirely dependent upon flexion or malposition of the uterus.

As to the second assumed cause of dysmenorrhœa: *Stenosis of the external os*.—How large should the external orifice be in order to call it normal? Vedeler generally uses a Simpson's sound of 4 mm. If his Sims sound of 3 mm. passes the external orifice with such difficulty that the operator has to employ as much force as is safe, he calls it a small orifice, and very small when it is no larger than a large pin-head. The external os was stenosed in 6 per cent. of the 252 cases given above, in 6 of which the orifice was very small; yet there was no pain. Vedeler does not seem to agree with Sinety, that the intensity of the pain depends on the quantity of the menstrual blood, and the exfoliated mucous membrane; if the blood comes slowly and in small quantity, it escapes without causing pain. Nor does he entirely agree with Lombe Atthill in saying that it is not unusual to find a cervical cavity of the size of a pin's head with which dysmenorrhœa is common.

Sims declares that inflammation of the cervical mucous membrane is a cause of dysmenorrhœa; but Vedeler's tables show 5 cases of cervical endometritis in virgins, 12 in unmarried women, and 25 married, in all 42 cases, without pain at the menstrual period. Vedeler further declares that in cervical endometritis, not only a large sound may be passed but in many cases the end of the forefinger may be carried into the cervix.

Cervical myoma and mucous polypi.—These are stated to be causes of dysmenorrhœa, but Vedeler declares that they are extremely rare. Not one case was found in his 252. Further in 5800 patients he has not seen a single case of dysmenorrhœa which was caused by polypi, and only three caused by cervical myoma.

Vedeler then gives a table of 100 cases of dysmenorrhœa, of which 13 were virgins, 47 were unmarried, and 40 married; 82 had had no children, 18 had had one or more. It is seen from the table how commonly dysmenorrhœa and sterility are associated together. In the 100 cases anteversion was present in 71 cases, retroflexion in 4, the position was normal in 8, anteversion in 6, and retroversion in 11. The cervical canal was of normal direction in 20 per cent., and abnormally curved in 75 per cent.¹ From this it seems that flexions of the uterus, and especially anteversion, have a great influence in the etiology of dysmenorrhœa, anteversion being present in 71 per cent. of all the cases. Retroflexion

¹ He fails to account for the other 5 per cent.

was present in 4 per cent., anteversion in 6 per cent., retroversion in 11 per cent., and the position was normal in 8 per cent.

Only 18 of the 100 cases had had any children. The others were nulliparæ. An analysis of the table shows that the 71 per cent. of anteflexed uteri all occurred in nulliparæ. Of the 4 per cent. of retroflexed uteri, 3 per cent. were nulliparæ. Of the nulliparæ 9 per cent. had uteri in normal position, 7 per cent. were anteverted, and 9 per cent. retroverted. From a consideration of these facts Vedeler concludes that *flexions of the uterus* have a marked influence on dysmenorrhœa, while he questions the influence of stenosis of the external os, and of endometritis (as far as its mechanical influence is concerned), and believes that the mechanical theory of dysmenorrhœa will soon be thought of only as a myth.—*Archiv für Gynäkologie*, Bd. xxi. Hft. ii.

Pathology and Treatment of Uterine Myoma.

At the meeting of the Obstetrical Society of London, on July 4th, Mr. LAWSON TAIT, during the course of his remarks on this subject, said that the word "myoma" should entirely supersede the incorrect term "uterine fibroid." The growth of ordinary myoma was limited to the period of sexual activity, was influenced by the menstrual function, and probably its ultimate cause would be found in some disturbance of the nervous body which governed that function. The presence of a myoma indefinitely delayed the menopause. Menstruation and ovulation, he thought, were completely independent functions, having perhaps a community of purpose. Removal of the ovaries often did not affect menstruation, but removal of the tubes nearly always did so. But in one case in which he had removed the ovaries, tubes, and part of the fundus uteri, menstruation continued for more than a year. He deprecated the triple subdivision of myomata into submucous, intramural, and subperitoneal. For pathological and surgical purposes, he proposed a new subdivision into the nodular and the concentric. The latter consisted of a uniform hypertrophy of the muscular tissue of the uterus, in the midst of which the canal lay centrally; the tissue of this form was loose, and usually very œdematous. Of the nodular myoma he proposed two sub-varieties, the simple and the multinodular. He believed that each nodule was seated in a central arterial twig, and that its growth was endogenous, the older tissue being on the outside. The dependence of such growth on menstruation was proved by the fact that arrest of menstruation arrested the growth, or even caused the complete disappearance, of such tumours. This had been in several cases brought about by the removal of the Fallopian tubes only. He had treated 54 cases of uterine myoma by removal of the uterine appendages, with 3 deaths, a mortality of 5.5 per cent., a striking contrast to the results of hysterectomy. Of these 51, in 38 the results had been carefully followed, and were everything that was to be desired. In 3, the tumours were, or became, malignant. In 3 others, the tumours continued to grow, although menstruation had been arrested. The author suspected that these were either fibro-cystic, or myoma of the concentric variety, in neither of which forms was the removal of the uterine appendages useful.

THE PRESIDENT was hardly prepared to accept Mr. Tait's classification, but it was not necessarily antagonistic to the one in common use. He agreed with Mr. Tait as to the delay in the menopause in these cases. He would like further evidence as to the sole or even large influence of the tubes in the phenomena of menstruation.

Dr. HERMAN had published a case in which the symptoms of a fibroid polypus first appeared sixteen years after the menopause. The history of patients after

operations like those of Mr. Tait was of great importance, for patients not benefited often did not return to the operator, and he therefore was apt to get a too favourable impression of the results.

Dr. DEVAR asked if Mr. Tait was careful to tie the uterine artery; and whether removal of the Fallopian tubes, leaving the ovaries, was not dangerous. He had seen one case in which the uterine appendages had been removed, and hysterectomy was subsequently required on account of hemorrhage.

Dr. MEADOWS preferred the present classification of fibroid growths to that suggested by Mr. Tait, as being founded on clinical characters, and of great practical value for diagnosis and treatment. He believed that the ovaries, and not the tubes, were the prime movers in menstruation. In one case he had removed the ovaries and left the tubes, and menstruation ceased. He thought there were many exceptions to the rule that uterine fibromata ceased to grow after the menopause. Notwithstanding the high rate of mortality which attended hysterectomy, he preferred it to the removal of the ovaries.

Mr. LAWSON TAIT said that cases of growth of apparent uterine myomata after the menopause needed most careful examination. Occasionally removal of the ovaries arrested menstruation, but this was the exception. He had never knowingly tied the uterine artery, and it would be very difficult to do so.—*British Med. Journal*, July 21, 1883.

— *Accumulations of Pus in the Uterus.*

Prof. N. F. TOLOCHINOFF, of Kieff, describes that rare form of purulent accumulation in the uterine cavity which is occasionally met in old women far advanced in their climacteric period. This affection, references to which the author could find only in English literature (Tilt, R. Barnes, Matthews Duncan, Ashwell, Graily Hewitt), is characterized mainly by periodical discharge of offensive pus through the os, which remains pervious to a sound. The introduction of the latter is always accompanied by the escape of purulent fluid from the womb. The uterine cavity is invariably enlarged, its walls being more or less thinned. The uterus at the level of the internal os is often retroflexed or ante-flexed. The patients mostly complain of general weakness, and of constant or periodical pains low down in the pelvis. The periodical increase of pelvic pain coincides with the appearance of purulent discharge. The latter possesses very irritating properties, giving rise to colpitis, distressing pruritus of the external genitals, chronic eczema of the thighs, etc. Many of the patients present yellowish pallor of the face.

Passing to the theory of these cases, Professor Tolochinoff comes to the conclusion that the affection results from anterior catarrh of long standing. Any slight obstruction (as caused by a flexion or initial cancerous consolidation of the cervical tissues) to the escape of uterine discharge may lead to retention of the secretion, with gradual distension of the thin walls of the atrophic senile womb. Under the influence of the air which still can penetrate through the pervious os, the retained catarrhal fluid undergoes decomposition, acting very irritatingly on the mucous membrane, and producing ulceration with more or less abundant purulent secretion. (In the author's cases the quantity of pus discharged at a time was not more than one or two tablespoonfuls; but in Ashwell's case it was about ten ounces.)

The author details two of his cases of the affection in question, and the treatment they underwent. In one of the cases, Duncan's intra-uterine injections of nitrate of silver, Barnes's introduction of solid sulphate of zinc, and injections of tincture of iodine and salicylic acid, brought only slight relief. The author decided then to treat the uterine cavity as if it were an abscess. Accordingly, he

introduced an intra-uterine pessary in the shape of a silver drainage-tube and daily washed the womb through it with one per cent. solution of carbolic acid. A considerable improvement both of the local conditions and of the general health followed. The occasional removal of the drainage-pessary was followed within two or three weeks by the return of pelvic pains, purulent discharge, and general symptoms. By the end of two years, complete recovery was seemingly obtained: the uterine cavity decreased from 8 to 6 centimetres; the discharge ceased, and did not reappear after taking out the intra-uterine tube. The other patient is still under observation.—*London Med. Record*, July, 1883.

Puerperal Inversion of the Uterus.

Prof. BRAUN, of Vienna, reports in the *Wiener Med. Blätter*, Feb. 22, the following interesting case, with remarks: A primipara, æt 20, well nourished, but somewhat flabby and moderately plethoric, was delivered naturally of a healthy male child, about five hours after the rupture of the membranes, at 3 A. M. on July 1. A few minutes later, without any traction having been made on the umbilical cord, a bag of membranes filled with blood protruded from the vulva and soon burst, discharging an enormous quantity of blood, mostly fluid, followed immediately by the inverted uterus with the placenta partly attached to its surface. The attendant, whose hand had been gently rubbing the abdomen, felt it at the same time suddenly empty. The uterus was replaced within the vulva, the placenta detaching itself in the process, and taxis was applied with the flexor surface of the fingers of the left hand. The right wall, corresponding to the pressure of the four fingers, was reduced first, and the other followed at once. Friction was then applied to the uterine wall by the right hand on the abdomen, against the left in the uterine cavity. Two quarts of a 2 per cent. carbolic solution were injected into the uterus, followed by four quarts of cold water, and subcutaneous injections of ergotin were employed. The patient had lost more than 63 ounces of blood, had almost lost consciousness, and was nearly pulseless. The lower extremities were, therefore, entirely enveloped in elastic bandages, the hip raised, and ether injections, tea with rum, etc. administered, until the pulse became moderately strong, and about 104 in the minute. The temperature was not taken on account of the necessity of keeping the patient warmly covered. Ice was placed on the abdomen, and no massage employed, and the uterus contracted so well that five stools passed within the twenty-four hours without causing any attempt at inversion. In spite of the free administration of stimulants and fluid nourishment, by mouth and rectum, the heart's action increased until on the evening of the second day the pulse was 152, with a temperature of 97.16° F., and a disproportion between pulse and temperature was still present two weeks afterwards. The importance of the auto-transfusion by means of the elastic bandages was shown by the subsequent history. When they were only partially loosened on the thigh, after four hours, symptoms of threatening collapse necessitated their re-application in a quarter of an hour; the attempt some hours later to bandage an arm and set free one leg produced dizziness, and the bandages could not be fully removed until after nineteen hours.

This case went on to complete involution of the uterus and usual health, and shows the operation of complete atony of at least a portion of the uterus in the production of inversion, which may then be induced even by the pressure of the abdominal muscles, so that it is not necessary to refer it always to external influences. The blood liberated by the partial detachment of the placenta collects between it and the uterine walls, flows into the membranes, and presses them down to the vulva, out of which they protrude, the blood behind meanwhile

dilating the lower segment of the uterus. The sudden bursting of the membranes and escape of the blood causes the inversion of the distended uterus, a partial inversion having probably already begun at the uncontracted seat of placental attachment, which may have been aided by traction on the part of the membranes.

Inversion is not so rare in primipara as has been imagined, and the following are the causes of its production in them :—

1. Feebleness of uterine contractions from the length of the labour, even when it is terminated by forceps, is the first cause.

2. Attachment of the placenta to the fundus, which is more common in primiparae, predisposes to inversion.

3. The tense vaginal walls do not give under the downward force, and therefore do not so easily prevent inversion.

4. The narrow vulva serves to hinder the outflow of the blood, and so facilitates inversion through distension, and subsequent sudden escape of the blood.

In multiparae, a predisposition to inversion may be occasioned by adherent placenta in previous labours.—*Lond. Med. Record*, July 15, 1883.

MEDICAL JURISPRUDENCE AND TOXICOLOGY.

Diffusion of Arsenic through the Body when thrown into the Mouth and Rectum after Death.

A recent murder trial in Michigan has brought out some new facts regarding the post-mortem diffusion of poisonous substances, which are substantially as follows: After the death of a lady, whose symptoms strongly pointed to arsenic poisoning, the husband, with a view of preserving the body for removal, injected arsenic suspended in water into the mouth and rectum. He claims to have put about a teaspoonful of arsenic into a teacupful of water, and to have injected one syringe-ful into the mouth and two into the rectum. The syringe which he claims to have used was an ordinary bulb syringe, with rectal tube attached.

One hundred and five days after her death the body was taken up, and the stomach and rectum placed in one jar, and a piece of the liver and one kidney in another; and the jars were sent to Prof. A. B. PRESCOTT for analysis of their contents. Dr. Prescott found in the stomach and rectum together about twenty grains of arsenious oxide, and from his analysis he calculated the amount in the whole liver to be from six to fifteen grains, according to the size of that organ. Later the body was again taken up, and the brain and a part of the muscles of the calf of the leg sent to Prof. Prescott for analysis. In these he failed to find any poison.

The question asked the experts, and the one which this paper considers, was: "Granting that the arsenic was injected into the mouth and rectum in the manner claimed, could it reach the liver and other organs outside the alimentary canal?" This was the main question, and on it the experts were divided.

In order to determine this question, Drs. VAUGHAN and DAWSON made the following experiments: A large musk-rat was killed, and about 50 grains (3.24 grammes) of arsenious oxide suspended in cold water were injected with an ordinary bulb syringe with rectal tube attached into the mouth and rectum. The rat was placed in a pine box and buried. After twenty-five days it was disinterred, and the various organs removed and subjected to analysis.

The lungs contained a much larger amount of arsenic than the stomach. Evidently the larger portion of that injected into the mouth passed down the trachea instead of going down the œsophagus—indeed, the amount found in the liver is larger than that found in the stomach. It is likely that the poison passed from the lungs into the liver. The amount found in the brain is large, but in the musk-rat the bones of the skull are thin in texture, and are not firmly united.

In the second experiment a cadaver was used. The person had been dead between two and three days when the injection was made. An unweighed quantity of arsenious oxide was suspended in cold water, and this was injected by means of a common bulb syringe, with rectal tube, into the mouth and rectum. The body was laid away in a dry cellar for twenty-five days. The various parts of the body were then removed, weighed, and subjected to analysis. In dissecting the body, it was observed that, although the cuticle had decomposed to a certain extent, the internal organs were firm to the touch, and remained in a fair state of preservation. This was true of all the parts removed, except the brain, which was broken down to a semi-fluid condition.

While the right kidney contained only an unweighable quantity, the left kidney furnished nearly as large a per cent. of arsenic as was furnished by the liver. We account for this by supposing that on the right side the liver caught up the greater portion of the arsenic passing down from the right lung, while on the left side the arsenic passed on more freely into the kidney. Contrary to what was observed in the experiments on the musk-rat, the stomach of the cadaver contained a large amount of arsenic, and it seems probable that some of the fluid thrown into the mouth passed directly into the stomach. We were surprised at finding the arsenic in the brain, and the query arises, by what avenue did the poison reach this organ? We noticed that, while throwing the fluid into the mouth at one time, when the bulb of the syringe was very forcibly compressed, a portion of the fluid returned through the nose. It is probable that some of the arsenic adhered to the roof of the pharynx and along the nasal passages, and from thence penetrated the brain.

It will be seen from these experiments that the arsenic was quite as widely diffused through the body as it would have been had it been administered during life, and had it been the cause of death. These experiments also show that in a case of suspected arsenical poisoning, if arsenic has been introduced into the mouth and rectum in the manner above given after death, the finding of the poison in the various organs mentioned will be no proof that the poison was administered during life and caused death. Now, embalming fluids containing arsenic are quite generally and indiscriminately used. They are used by the physician, by the undertaker, and by others who prepare the body for burial. Some throw the fluid into the mouth or rectum, or both; some puncture the abdominal walls with a trocar and then fill the cavity with the fluid; others simply bathe the body with some soluble form of arsenic, or cover the body with cloths saturated with such a solution; others still inject a solution of arsenic into an artery. The most weighty argument yet urged against cremation is that it may be used as a means of covering up crime; but in a case of arsenical poisoning the use of an arsenical embalming fluid may be employed as a more certain method of covering up the crime than the incineration of the body would be. On the other hand, as long as the present frequent use of these embalming fluids continues, some innocent person may be accused of committing murder by arsenical poisoning, and, arsenic being found in the body, may suffer an unjust sentence.

In all of these experiments, not only were "chemically pure" reagents used, but these were thoroughly tested for arsenic.—*Journ. of the American Med. Assoc.*, Aug. 4, 1883.

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BELLEVUE HOSPITAL MEDICAL COLLEGE, CITY OF NEW YORK.

SESSIONS OF 1883-84.

The standard of Medical Ethics recognized by the College is embodied in the Code of Ethics of the American Medical Association.

The COLLEGIATE YEAR embraces the Regular Winter Session and a Spring Session. The REGULAR SESSION begins on Wednesday, September 19, 1883, and ends about the middle of March, 1884. During this Session, in addition to the regular didactic lectures, two or three hours are daily allotted to clinical instruction. Attendance upon two regular courses of lectures is required for graduation. The SPRING SESSION consists chiefly of recitations from Text-Books. This Session begins about the middle of March, and continues until the middle of June. During this Session, daily recitations in all the departments are held by a corps of Examiners appointed by the Faculty. Short courses of lectures are given on special subjects, and regular clinics are held in the Hospital and in the College building.

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For the Annual Circular and Catalogue, giving regulations for graduation and other information, address Prof. AUSTIN FLINT, JR., Secretary, Bellevue Hospital Medical College.

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Lecturer on Diseases of the Eye

SAMUEL LOGAN, M.D.,
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ALBERT B. MILES, M.D.,
Demonstrator of Anatomy.

The next annual course of instruction in this Department (now in the fiftieth year of its existence) will commence on Monday, the 22d day of October, 1883, and terminate on Saturday the 29th day of March, 1884. The first four weeks of the term will be devoted exclusively to Clinical Medicine and Surgery at the Charity Hospital: Practical Chemistry in the Laboratory; and dissections in the spacious and airy Anatomical Rooms of the University.

The means of teaching now at the command of the Faculty are unsurpassed in the United States. Special attention is called to the opportunities presented for

CLINICAL INSTRUCTION.

The Act establishing the University of Louisiana gives the professors of the Medical Department the use of the great Charity Hospital, as a school of practical instruction.

The Charity Hospital contains nearly 700 beds, and received, during the last year, nearly six thousand patients. Its advantages for practical study are unsurpassed by any similar institution in this country. The Medical, Surgical, and Obstetrical Wards are visited by the respective Professors in charge daily, from eight to ten o'clock A. M., at which time all the Students are expected to attend, and familiarize themselves, AT THE BEDSIDE OF THE PATIENTS, with the diagnosis and treatment of all forms of injury and disease.

The regular lectures at the hospital, on Clinical Medicine by Professors Bemiss and Joseph Jones, Surgery by Professors Richardson and Logan, Diseases of Women and Children by Professor Lewis, and Special Pathological Anatomy by Professor Chaille, will be delivered in the amphitheatre on Monday, Wednesday, Thursday and Saturday, from 10 to 12 o'clock, A. M.

The Administrators of the Hospital elect, annually, after competitive examination, **FOURTEEN RESIDENT STUDENTS**, who are maintained by the Institution.

TERMS.

For the Tickets of all the Professors	.	.	.	.	\$140 00
For the Ticket of Practical Anatomy	.	.	.	.	10 00
Matriculation Fee	.	.	.	.	5 00
Graduation Fees	.	.	.	.	30 00

Candidates for graduates are required to be twenty-one years of age; to have studied three years: to have attended two courses of lectures, and to pass a satisfactory examination.*

Graduates of other respectable schools are admitted upon payment of the Matriculation and half-lecture fees. They cannot, however, obtain the Diploma of the University without passing the regular examination and paying the usual Graduation Fee.

As the practical advantages here afforded for a thorough acquaintance with all the branches of medicine and surgery are **QUITE EQUAL** to those possessed by the schools of New York and Philadelphia, the same fees are charged.

For further information, address

T. G. RICHARDSON, M.D., *Dean*.

* For further information upon those points see circular.

THE
JEFFERSON MEDICAL COLLEGE
OF PHILADELPHIA.

THE Fifty-ninth Session of the Jefferson Medical College will begin on Monday, October 1st, 1883, and will continue until the end of March, 1884. Preliminary Lectures will be held from Monday, 11th of September.

PROFESSORS.

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LL.D. Cantab. (Emeritus).

Institutes and Practice of Surgery.

ELLERSLIE WALLACE, M.D. (Emeritus).
Obstetrics and Diseases of Women and
Children.

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SAMUEL W. GROSS, M.D.,
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JOHN H. BRINTON, M.D.,
Practice of Surgery and Clinical Surgery.

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CLINICAL INSTRUCTION is given *daily* at the HOSPITAL OF THE JEFFERSON MEDICAL COLLEGE throughout the year by Members of the Faculty, and by the Hospital Staff.

F E E S.

Matriculation Fee (paid once).....\$5 00	Practical Anatomy.....\$10 00
Ticket for each Branch (7) \$20.....140 00	Graduation Fee.....30 00
Fees for a full course of Lectures to those who have attended two full courses at other (recognized) Colleges—the matriculation fee, and .....\$70 00	
To Graduates of less than ten years of such Colleges—the matriculation fee, and \$50 00	
To Graduates of ten years, and upwards, of such Colleges—the matriculation fee only.	
To Dental Graduates the first course is \$60, and the second is \$100.	
To Graduates in Pharmacy the general ticket is \$100 for each year.	

The Annual Announcement, giving full particulars, will be sent on application to

ROBERTS BARTHOLOW M.D., *Dean.*

UNIVERSITY OF THE CITY OF NEW YORK, MEDICAL DEPARTMENT.

410 East Twenty-sixth St., opp. Bellevue Hospital, New York City.

FORTY-THIRD SESSION, 1883-84.

FACULTY OF MEDICINE.

REV. JOHN HALL, D.D., LL.D., *Chancellor of the University, pro tem.*

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| ALFRED C. POST, M.D., LL.D., Professor Emeritus of Clinical Surgery; President of the Faculty. | LEWIS A. STINSON, M.D., Professor of Physiology and Physiological Anatomy; Surgeon to Bellevue Hospital; Curator to Bellevue Hospital. |
| CHARLES INSLEE PARDEE, M.D., Dean of the Faculty; Professor of Otolaryngology to the Manhattan Eye and Ear Hospital. | FANEUIL D. WEISSE, M.D., Professor of Practical and Surgical Anatomy; Surgeon to Workhouse Hospital, B. I. |
| J. W. S. ARNOLD, M.D., Emeritus Professor of Physiology and Histology. | STEPHEN SMITH, M.D., Professor of Clinical Surgery; Surgeon to Bellevue Hospital. |
| JOHN C. DRAPER, M.D., LL.D., Professor of Chemistry. | A. E. MACDONALD, LL.B., M.D., Professor of Medical Jurisprudence and Diseases of the Mind; Medical Superintendent of the New York City Asylum for the Insane. |
| ALFRED L. LOOMIS, M.D., Professor of Pathology and Practice of Medicine; Visiting Physician to Bellevue Hospital. | R. A. WITTHAUS, M.D., Professor of Physiological Chemistry. |
| WM. DARLING, M.D., LL.D., F.R.C.S., Professor of General and Descriptive Anatomy. | HERMAN KNAPP, M.D., Professor of Ophthalmology; Surgeon to the Ophthalmic Institute. |
| WILLIAM H. THOMSON, M.D., Professor of Materia Medica, Therapeutics and Diseases of the Nervous System; Visiting Physician to Bellevue Hospital. | S. OAKLEY VANDERPOEL, M.D., LL.D., Professor of Public Hygiene. |
| J. WILLISTON WRIGHT, M.D., Professor of Surgery; Visiting Surgeon to Bellevue Hospital. | AMBROSE L. RANNEY, M.D., Curator of Museum. |
| WM. M. POLK, M.D., Professor of Obstetrics and the Diseases of Women and Children; Gynecologist to Bellevue Hospital. | JOSEPH E. WINTERS, M.D., Demonstrator of Anatomy. |

ADJUNCT LECTURERS.

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| F. R. S. DRAKE, M.D., Clinical Lecturer on Practice of Medicine; Visiting Physician to Bellevue Hospital. | JOSEPH E. WINTERS, M.D., Clinical Lecturer on Diseases of Children. |
| N. M. SHAFFER, M.D., Clinical Lecturer on Orthopaedic Surgery; Surgeon in Charge of the N. Y. Orthopaedic Hospital. | WILLIAM C. JARVIS, M.D., Clinical Lecturer on Laryngology. |
| P. A. MORROW, M.D., Clinical Lecturer on Dermatology. | LAWRENCE JOHNSON, M.D., Lecturer on Medical Botany. |

THE PRELIMINARY SESSION will begin on Wednesday, September 19, 1883, and end October 3, 1883. It will be conducted on the same plan as the Regular Winter Session.

THE REGULAR WINTER SESSION will begin October 3, 1883, and end about the middle of March, 1884. The Plan of Instruction consists of Didactic and Clinical Lectures, recitation, and laboratory work in all subjects in which it is practicable. To put the laboratories on a proper footing a new building has been erected at an expense of thirty-five thousand dollars. It will contain laboratories fitted for instruction in Chemistry, Histology, Pathology, Materia Medica, Operative Surgery and Gynecology.

Two to five Didactic lectures and two or more Clinical Lectures will be given each day by members of the Faculty. In addition to the ordinary Session, an **ADDITIONAL** Session. For this purpose the candidates will be divided into sections of twenty-five members each. At these special clinics students will have excellent opportunities to make and verify diagnoses, and watch the effects of treatment. They will be held in the Wards of the Hospitals and at the Public and College Dispensaries.

Each of the seven professors of the Regular Faculty will conduct a recitation on his subject one evening each week. Students are thus enabled to make up for lost lectures, and prepare themselves properly for their final examinations without additional expense.

THE SPRING SESSION will begin about the middle of March and end the last week in May. The daily Clinics and Special Practical Courses will be the same as in the Winter Session, and there will be Lectures on Special Subjects by the Members of the Faculty. It is supplementary to the Regular Winter Session. Nine months of continued instruction are thus secured to all students of the University who desire a thorough course.

FEES.

For course of Lectures.....	\$140 00
Matriculation	5 00
Demonstrator's Fee, including material for dissection.....	10 00
Final Examination Fee.....	30 00

For further particulars and circulars address the Dean,

PROF. CHAS. INSLEE PARDEE, M.D.,
University Medical College, 410 East 26th St., New York City.
S.M.S. MEDICAL COLLEGE,

